

November 27, 2023

Mr. Michael Smith, P.E., Environmental Engineer Senior
IDNR – Land Quality Bureau
Wallace State Office Building
502 East 9th Street
Des Moines, Iowa 50319-0034



**RE: 2023 WATER QUALITY RESULTS – MW-213
AREA A - MARSHALL COUNTY SANITARY LANDFILL
CLOSURE PERMIT # 64-SDP-6-92C**

Dear Mr. Smith:

This letter forwards the results of water quality testing performed in 2023 at MW-213 in accordance with the requirements of IDNR Letter dated December 15, 2021 (Doc #101864) and the requirements of Permit Amendment #11 dated December 21, 2021 (Doc #101911).

Water samples were collected on April 10, 2023 and October 13, 2023 at MW-213 (in excess of the annual requirement). Note that the volume of water available for the sample on October 13, 2023 was limited and only the VOC fraction was collected. The Analytical Reports are included in Attachment A.

The detected compounds in 2023 include:

Volatile Organic Compounds

1,1-dichloroethane
1,2-dichloropropane
Benzene
Chloroethane
cis-1,2-Dichloroethylene
Vinyl Chloride

Inorganic Compounds (Metals)

Barium*

* Spring sample only, there was no fall sample collected for metals on October 13, 2023.

Tables and graphs are attached summarizing all data recorded since October 13, 2016 (Attachment B). Barium is the only compound (of all VOC or metals) that is detected during every reported monitoring episode.

A summary table and a graph of water elevation over time in MW-213 is also prepared and attached (Attachment C). Concurrent review of the metal compound concentrations summary and the water elevation summary indicate that metal compounds (beyond barium) are only detected at MW-213 during three (3) sample collection events and that those three (3) events correspond to the lowest recorded water elevations (10/19/2020, 4/6/2022, and 10/25/2022).

It is also recognized that the turbidity of the well is increased during periods of low water elevations in the well (Attachment C).

It is surmised that the metals and sediment become more concentrated as available water for sample collection becomes limited.

Permit Amendment #11 dated December 21, 2021 (Doc #101911) requires ongoing sampling at MW-213. The water quality results, along with the water table elevations and turbidity will again be evaluated and reported in 2024 as required.

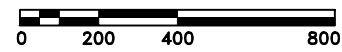
Please feel free to contact our office at (515) 733-4144 with any questions you may have.

Respectfully Submitted,
HLW Engineering Group



Todd Whipple, CPG.
Project Manager

cc: Don Ballalatak, Manager



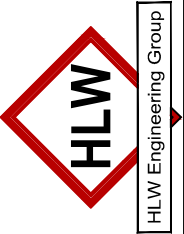
CONTOURS WITHIN AREA B4-7
FROM BASE RECORD SURVEY OCT
16, 2017. REMAINING CONTOURS
FROM SEP, 2017 AERIAL.



FIGURE: 1		NO.	DATE
REVISION	DRAWN	PROJECT NO.	DATE
	DRA	6003	11-25-23

SITE PLAN WITH
SUBSURFACE GAS PROBE LOCATIONS
MARSHALL COUNTY SANITARY LANDFILL
MARSHALLTOWN, IOWA

HLW Engineering Group
204 West Broad Street, P.O. Box 314
Story City, Iowa 50248
Phone: (515) 733-4144
FAX: (515) 733-4146



WATER ELEVATION
OCTOBER 13, 2023

WELL	ELEV.
MW-49	997.23
MW-54	1014.91
MW-66	<980.54
MW-81	986.95
MW-85	1001.32
MW-87	955.03
MW-89	998.87
MW-91	966.43
MW-93	902.42
MW-94	1009.54
MW-95	968.18
MW-96R	928.05
MW-97	997.56
MW-98	944.72
MW-99	901.25
MW-120	938.23
MW-121	924.53
MW-201	991.12
MW-205	968.90
MW-212	944.46
MW-213	916.76
MW-214	945.33
LW-73	964.13
LW-75	1018.48
LW-78	974.26
LW-79	995.62

NOTE: ELEVATION OF
MW-66 REPRESENTS
THE BOTTOM OF A
DRY WELL.



CONTOURS WITHIN AREA B4-7
FROM BASE RECORD SURVEY OCT
16, 2017. REMAINING CONTOURS
FROM SEP, 2017 AERIAL.

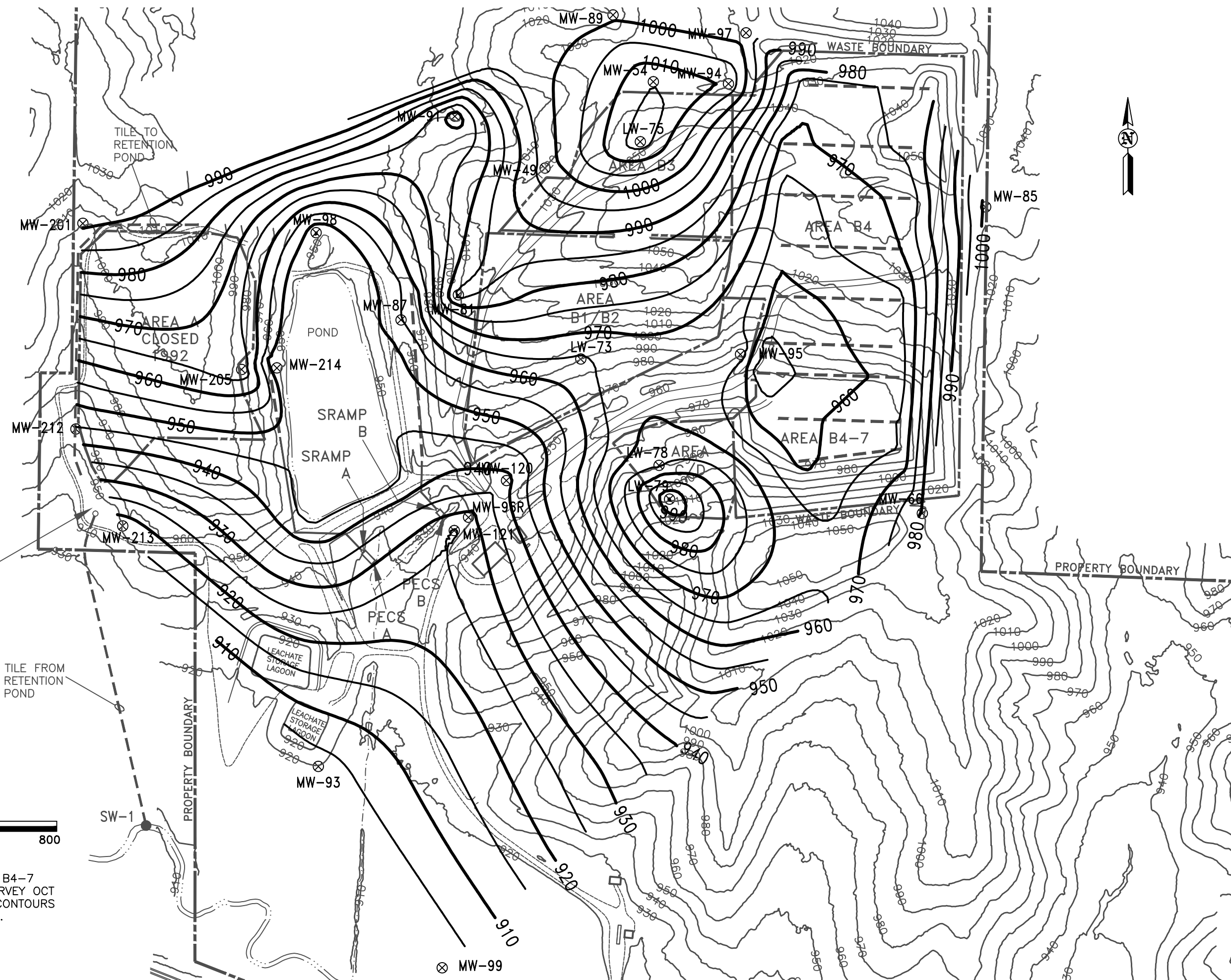
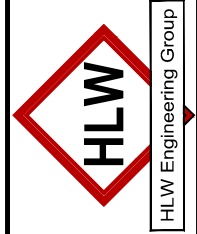


FIGURE: 2		DATE	
REVISION	NO.	PROJECT NO.	DATE
DRAWN	DRA	6003	11-25-23

GROUNDWATER CONTOUR MAP
MARSHALL COUNTY SANITARY LANDFILL
MARSHALLTOWN, IOWA

HLW Engineering Group
204 West Broad Street, P.O. Box 314
Story City, Iowa 50248
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ATTACHMENT A

Laboratory Analytical Reports

4/10/2023

10/13/2023

ANALYTICAL REPORT

April 27, 2023

Page 1 of 17

Work Order: 1GD0990

Report To
Todd Whipple HLW Engineering PO Box 314 Story City, IA 50248

Work Order Information
Date Received: 4/11/2023 9:23:00AM Collector: Whipple, Todd Phone: (515) 733-4144 PO Number:

Project: Marshall Sanitary Landfill-New Regs

Project Number: 6003

Analyte	Result	MRL	Batch	Method	Analyst	Analyzed	Qualifier
1GD0990-01	MW-213			Matrix: Water		Collected: 04/10/23 07:20	
Acrylonitrile	<5.0 ug/L	5.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Surrogate: Dibromofluoromethane	116 %			80-126	LNH	04/14/23 15:03	
Surrogate: 1,2-Dichloroethane-d4	100 %			63-138	LNH	04/14/23 15:03	
Surrogate: Toluene-d8	97.8 %			87-116	LNH	04/14/23 15:03	
Surrogate: 4-Bromofluorobenzene	98.0 %			85-111	LNH	04/14/23 15:03	
Chloromethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Vinyl Chloride	2.5 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Bromomethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Chloroethane	2.5 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Trichlorofluoromethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,1-Dichloroethylene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Acetone	<10.0 ug/L	10.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Methyl Iodide	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Carbon Disulfide	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Methylene Chloride	<5.0 ug/L	5.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
trans-1,2-Dichloroethylene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,1-Dichloroethane	2.5 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Vinyl Acetate	<5.0 ug/L	5.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
cis-1,2-Dichloroethylene	21.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
2-Butanone (MEK)	<10.0 ug/L	10.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Bromochloromethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Chloroform	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,1,1-Trichloroethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Carbon Tetrachloride	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Benzene	1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,2-Dichloroethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Trichloroethylene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,2-Dichloropropane	5.6 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	

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HLW Engineering
PO Box 314
Story City, IA 50248

April 27, 2023
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Work Order: 1GD0990

Analyte	Result	MRL	Batch	Method	Analyst	Analyzed	Qualifier
1GD0990-01	MW-213			Matrix: Water		Collected: 04/10/23 07:20	
Dibromomethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Bromodichloromethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
cis-1,3-Dichloropropene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
4-Methyl-2-pentanone (MIBK)	<5.0 ug/L	5.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Toluene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
trans-1,3-Dichloropropene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,1,2-Trichloroethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Tetrachloroethylene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
2-Hexanone (MBK)	<5.0 ug/L	5.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Dibromochloromethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,2-Dibromoethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Chlorobenzene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,1,1,2-Tetrachloroethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Ethylbenzene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Xylenes, total	<2.0 ug/L	2.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Styrene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Bromoform	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,2,3-Trichloropropane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
trans-1,4-Dichloro-2-butene	<5.0 ug/L	5.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,1,2,2-Tetrachloroethane	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,4-Dichlorobenzene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,2-Dichlorobenzene	<1.0 ug/L	1.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
1,2-Dibromo-3-chloropropane	<5.0 ug/L	5.0	1GD0727	EPA 8260B	LNH	04/14/23 15:03	
Surrogate: Dibromofluoromethane	116 %			75-136	LNH	04/14/23 15:03	
Surrogate: 1,2-Dichloroethane-d4	100 %			61-142	LNH	04/14/23 15:03	
Surrogate: Toluene-d8	97.8 %			82-121	LNH	04/14/23 15:03	
Surrogate: 4-Bromofluorobenzene	98.0 %			80-116	LNH	04/14/23 15:03	
Silver, total	<0.0040 mg/L	0.0040	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Arsenic, total	<0.0040 mg/L	0.0040	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Barium, total	0.674 mg/L	0.0040	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Beryllium, total	<0.0040 mg/L	0.0040	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Cadmium, total	<0.0008 mg/L	0.0008	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Cobalt, total	<0.0004 mg/L	0.0004	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Chromium, total	<0.0080 mg/L	0.0080	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Copper, total	<0.0040 mg/L	0.0040	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Nickel, total	<0.0040 mg/L	0.0040	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Lead, total	<0.0040 mg/L	0.0040	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Antimony, total	<0.0020 mg/L	0.0020	1GD0854	EPA 6020A	RVV	04/19/23 19:05	

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Work Order: 1GD0990

Analyte	Result	MRL	Batch	Method	Analyst	Analyzed	Qualifier
1GD0990-01	MW-213			Matrix: Water		Collected: 04/10/23 07:20	
Selenium, total	<0.0040 mg/L	0.0040	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Thallium, total	<0.0020 mg/L	0.0020	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Vanadium, total	<0.0200 mg/L	0.0200	1GD0854	EPA 6020A	RVV	04/19/23 19:05	
Zinc, total	<0.0200 mg/L	0.0200	1GD0854	EPA 6020A	RVV	04/19/23 19:05	

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Work Order: 1GD0990

Determination of Volatile Organic Compounds - Quality Control
Keystone Laboratories - Newton

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0727 - EPA 5030B

Blank (1GD0727-BLK1)

Prepared & Analyzed: 04/14/23

Surrogate: Dibromofluoromethane	56.3		ug/L	50.3520		112	80-126			
Surrogate: Dibromofluoromethane	56.3		"	50.3520		112	75-136			
Surrogate: 1,2-Dichloroethane-d4	50.3		"	50.4080		99.8	63-138			
Surrogate: 1,2-Dichloroethane-d4	50.3		"	50.4080		99.8	61-142			
Surrogate: Toluene-d8	49.2		"	50.2360		97.9	87-116			
Surrogate: Toluene-d8	49.2		"	50.2360		97.9	82-121			
Surrogate: 4-Bromofluorobenzene	48.2		"	50.4200		95.6	80-116			
Surrogate: 4-Bromofluorobenzene	48.2		"	50.4200		95.6	85-111			
Chloromethane	ND	1.0	"							
Vinyl Chloride	ND	1.0	"							
Bromomethane	ND	1.0	"							
Chloroethane	ND	1.0	"							
Trichlorofluoromethane	ND	1.0	"							
1,1-Dichloroethylene	ND	1.0	"							
Acetone	ND	10.0	"							
Methyl Iodide	ND	1.0	"							
Carbon Disulfide	ND	1.0	"							
Methylene Chloride	ND	5.0	"							
Acrylonitrile	ND	5.0	"							
trans-1,2-Dichloroethylene	ND	1.0	"							
1,1-Dichloroethane	ND	1.0	"							
Vinyl Acetate	ND	5.0	"							
cis-1,2-Dichloroethylene	ND	1.0	"							
2-Butanone (MEK)	ND	10.0	"							
Bromochloromethane	ND	1.0	"							
Chloroform	ND	1.0	"							
1,1,1-Trichloroethane	ND	1.0	"							
Carbon Tetrachloride	ND	1.0	"							
Benzene	ND	1.0	"							
1,2-Dichloroethane	ND	1.0	"							
Trichloroethylene	ND	1.0	"							
1,2-Dichloropropane	ND	1.0	"							
Dibromomethane	ND	1.0	"							
Bromodichloromethane	ND	1.0	"							
cis-1,3-Dichloropropene	ND	1.0	"							
4-Methyl-2-pentanone (MIBK)	ND	5.0	"							
Toluene	ND	1.0	"							
trans-1,3-Dichloropropene	ND	1.0	"							

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Work Order: 1GD0990

Determination of Volatile Organic Compounds - Quality Control
Keystone Laboratories - Newton

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0727 - EPA 5030B

Blank (1GD0727-BLK1)

Prepared & Analyzed: 04/14/23

1,1,2-Trichloroethane	ND	1.0	ug/L
Tetrachloroethylene	ND	1.0	"
2-Hexanone (MBK)	ND	5.0	"
Dibromochloromethane	ND	1.0	"
1,2-Dibromoethane	ND	1.0	"
Chlorobenzene	ND	1.0	"
1,1,1,2-Tetrachloroethane	ND	1.0	"
Ethylbenzene	ND	1.0	"
Xylenes, total	ND	2.0	"
Styrene	ND	1.0	"
Bromoform	ND	1.0	"
1,2,3-Trichloropropane	ND	1.0	"
trans-1,4-Dichloro-2-butene	ND	5.0	"
1,1,2,2-Tetrachloroethane	ND	1.0	"
1,4-Dichlorobenzene	ND	1.0	"
1,2-Dichlorobenzene	ND	1.0	"
1,2-Dibromo-3-chloropropane	ND	5.0	"

LCS (1GD0727-BS1)

Prepared & Analyzed: 04/14/23

Surrogate: Dibromofluoromethane	53.6		ug/L	50.3520	107	75-136
Surrogate: Dibromofluoromethane	53.6		"	50.3520	107	80-126
Surrogate: 1,2-Dichloroethane-d4	49.9		"	50.4080	99.0	63-138
Surrogate: 1,2-Dichloroethane-d4	49.9		"	50.4080	99.0	61-142
Surrogate: Toluene-d8	49.6		"	50.2360	98.7	82-121
Surrogate: Toluene-d8	49.6		"	50.2360	98.7	87-116
Surrogate: 4-Bromofluorobenzene	48.2		"	50.4200	95.6	80-116
Surrogate: 4-Bromofluorobenzene	48.2		"	50.4200	95.6	85-111
Chloromethane	26.86	1.0	"	30.0000	89.5	63-155
Vinyl Chloride	28.21	1.0	"	30.0000	94.0	70-154
Bromomethane	31.76	1.0	"	30.0000	106	52-176
Chloroethane	31.61	1.0	"	30.0000	105	72-148
Trichlorofluoromethane	30.48	1.0	"	30.0000	102	70-152
1,1-Dichloroethylene	54.56	1.0	"	50.0000	109	70-148
Acetone	81.68	10.0	"	104.100	78.5	43-172
Methyl Iodide	132.1	1.0	"	112.563	117	69-170
Carbon Disulfide	121.5	1.0	"	106.400	114	72-162
Methylene Chloride	48.27	5.0	"	50.0000	96.5	68-142
Acrylonitrile	84.62	5.0	"	100.500	84.2	67-144
trans-1,2-Dichloroethylene	52.03	1.0	"	50.0000	104	66-148

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April 27, 2023
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Work Order: 1GD0990

Determination of Volatile Organic Compounds - Quality Control
Keystone Laboratories - Newton

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0727 - EPA 5030B

LCS (1GD0727-BS1)

Prepared & Analyzed: 04/14/23

1,1-Dichloroethane	51.44	1.0	ug/L	50.0000		103	66-143			
Vinyl Acetate	55.69	5.0	"	103.300		53.9	43-153			
cis-1,2-Dichloroethylene	47.96	1.0	"	50.0000		95.9	71-149			
2-Butanone (MEK)	85.69	10.0	"	106.200		80.7	52-159			
Bromochloromethane	49.01	1.0	"	50.0000		98.0	69-143			
Chloroform	49.64	1.0	"	50.0000		99.3	69-144			
1,1,1-Trichloroethane	46.36	1.0	"	49.9750		92.8	62-129			
Carbon Tetrachloride	54.10	1.0	"	50.0000		108	63-141			
Benzene	49.29	1.0	"	50.0000		98.6	71-134			
1,2-Dichloroethane	46.60	1.0	"	50.0000		93.2	72-132			
Trichloroethylene	41.70	1.0	"	50.0000		83.4	71-135			
1,2-Dichloropropane	48.08	1.0	"	50.0000		96.2	69-136			
Dibromomethane	49.82	1.0	"	50.0000		99.6	73-147			
Bromodichloromethane	46.32	1.0	"	50.0000		92.6	68-129			
cis-1,3-Dichloropropene	48.42	1.0	"	50.3250		96.2	65-134			
4-Methyl-2-pentanone (MIBK)	69.06	5.0	"	103.100		67.0	58-147			
Toluene	48.39	1.0	"	50.0000		96.8	72-133			
trans-1,3-Dichloropropene	46.44	1.0	"	50.4250		92.1	67-130			
1,1,2-Trichloroethane	45.26	1.0	"	50.0000		90.5	69-135			
Tetrachloroethylene	48.44	1.0	"	50.0000		96.9	69-130			
2-Hexanone (MBK)	63.65	5.0	"	110.300		57.7	55-144			
Dibromochloromethane	49.82	1.0	"	49.5000		101	73-127			
1,2-Dibromoethane	46.40	1.0	"	50.0000		92.8	67-132			
Chlorobenzene	47.61	1.0	"	50.0000		95.2	72-123			
1,1,1,2-Tetrachloroethane	51.27	1.0	"	50.0000		103	73-127			
Ethylbenzene	46.20	1.0	"	50.0000		92.4	71-127			
Xylenes, total	136.0	2.0	"	150.000		90.6	74-127			
Styrene	44.62	1.0	"	50.0000		89.2	66-126			
Bromoform	51.00	1.0	"	50.0000		102	68-130			
1,2,3-Trichloropropane	43.49	1.0	"	50.0000		87.0	63-136			
trans-1,4-Dichloro-2-butene	71.88	5.0	"	102.400		70.2	54-134			
1,1,2,2-Tetrachloroethane	46.63	1.0	"	49.8500		93.5	61-131			
1,4-Dichlorobenzene	48.75	1.0	"	50.0000		97.5	70-129			
1,2-Dichlorobenzene	47.23	1.0	"	50.0000		94.5	69-126			
1,2-Dibromo-3-chloropropane	37.69	5.0	"	50.0000		75.4	50-143			

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Determination of Volatile Organic Compounds - Quality Control
Keystone Laboratories - Newton

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0727 - EPA 5030B

LCS Dup (1GD0727-BSD1)

Prepared & Analyzed: 04/14/23

Surrogate: Dibromofluoromethane	54.6		ug/L	50.3520		108	80-126			
Surrogate: Dibromofluoromethane	54.6		"	50.3520		108	75-136			
Surrogate: 1,2-Dichloroethane-d4	50.0		"	50.4080		99.2	61-142			
Surrogate: 1,2-Dichloroethane-d4	50.0		"	50.4080		99.2	63-138			
Surrogate: Toluene-d8	49.8		"	50.2360		99.1	87-116			
Surrogate: Toluene-d8	49.8		"	50.2360		99.1	82-121			
Surrogate: 4-Bromofluorobenzene	48.4		"	50.4200		95.9	85-111			
Surrogate: 4-Bromofluorobenzene	48.4		"	50.4200		95.9	80-116			
Chloromethane	26.19	1.0	"	30.0000		87.3	63-155	2.53	24	
Vinyl Chloride	26.99	1.0	"	30.0000		90.0	70-154	4.42	25	
Bromomethane	32.72	1.0	"	30.0000		109	52-176	2.98	27	
Chloroethane	30.65	1.0	"	30.0000		102	72-148	3.08	25	
Trichlorofluoromethane	29.52	1.0	"	30.0000		98.4	70-152	3.20	26	
1,1-Dichloroethylene	53.65	1.0	"	50.0000		107	70-148	1.68	24	
Acetone	77.66	10.0	"	104.100		74.6	43-172	5.05	30	
Methyl Iodide	138.0	1.0	"	112.563		123	69-170	4.38	30	
Carbon Disulfide	119.0	1.0	"	106.400		112	72-162	2.08	24	
Methylene Chloride	48.26	5.0	"	50.0000		96.5	68-142	0.0207	21	
Acrylonitrile	82.37	5.0	"	100.500		82.0	67-144	2.69	24	
trans-1,2-Dichloroethylene	51.74	1.0	"	50.0000		103	66-148	0.559	27	
1,1-Dichloroethane	51.39	1.0	"	50.0000		103	66-143	0.0972	24	
Vinyl Acetate	53.53	5.0	"	103.300		51.8	43-153	3.96	30	
cis-1,2-Dichloroethylene	47.20	1.0	"	50.0000		94.4	71-149	1.60	26	
2-Butanone (MEK)	94.61	10.0	"	106.200		89.1	52-159	9.89	27	
Bromochloromethane	50.82	1.0	"	50.0000		102	69-143	3.63	23	
Chloroform	50.17	1.0	"	50.0000		100	69-144	1.06	23	
1,1,1-Trichloroethane	46.12	1.0	"	49.9750		92.3	62-129	0.519	24	
Carbon Tetrachloride	55.25	1.0	"	50.0000		110	63-141	2.10	25	
Benzene	50.25	1.0	"	50.0000		100	71-134	1.93	24	
1,2-Dichloroethane	47.94	1.0	"	50.0000		95.9	72-132	2.83	24	
Trichloroethylene	42.15	1.0	"	50.0000		84.3	71-135	1.07	24	
1,2-Dichloropropane	49.80	1.0	"	50.0000		99.6	69-136	3.51	24	
Dibromomethane	51.66	1.0	"	50.0000		103	73-147	3.63	25	
Bromodichloromethane	48.12	1.0	"	50.0000		96.2	68-129	3.81	22	
cis-1,3-Dichloropropene	49.64	1.0	"	50.3250		98.6	65-134	2.49	23	
4-Methyl-2-pentanone (MIBK)	69.03	5.0	"	103.100		67.0	58-147	0.0434	27	
Toluene	49.22	1.0	"	50.0000		98.4	72-133	1.70	24	
trans-1,3-Dichloropropene	48.18	1.0	"	50.4250		95.5	67-130	3.68	24	

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Determination of Volatile Organic Compounds - Quality Control
Keystone Laboratories - Newton

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0727 - EPA 5030B

LCS Dup (1GD0727-BSD1)				Prepared & Analyzed: 04/14/23						
1,1,2-Trichloroethane	47.56	1.0	ug/L	50.0000		95.1	69-135	4.96	23	
Tetrachloroethylene	49.08	1.0	"	50.0000		98.2	69-130	1.31	25	
2-Hexanone (MBK)	65.57	5.0	"	110.300		59.4	55-144	2.97	25	
Dibromochloromethane	51.83	1.0	"	49.5000		105	73-127	3.95	22	
1,2-Dibromoethane	48.45	1.0	"	50.0000		96.9	67-132	4.32	24	
Chlorobenzene	48.47	1.0	"	50.0000		96.9	72-123	1.79	23	
1,1,1,2-Tetrachloroethane	52.56	1.0	"	50.0000		105	73-127	2.48	24	
Ethylbenzene	46.96	1.0	"	50.0000		93.9	71-127	1.63	26	
Xylenes, total	138.2	2.0	"	150.000		92.1	74-127	1.65	25	
Styrene	43.56	1.0	"	50.0000		87.1	66-126	2.40	23	
Bromoform	53.94	1.0	"	50.0000		108	68-130	5.60	23	
1,2,3-Trichloropropane	45.76	1.0	"	50.0000		91.5	63-136	5.09	24	
trans-1,4-Dichloro-2-butene	76.19	5.0	"	102.400		74.4	54-134	5.82	27	
1,1,2,2-Tetrachloroethane	48.07	1.0	"	49.8500		96.4	61-131	3.04	29	
1,4-Dichlorobenzene	48.50	1.0	"	50.0000		97.0	70-129	0.514	24	
1,2-Dichlorobenzene	47.73	1.0	"	50.0000		95.5	69-126	1.05	26	
1,2-Dibromo-3-chloropropane	39.16	5.0	"	50.0000		78.3	50-143	3.83	30	

Matrix Spike (1GD0727-MS1)		Source: 1GD1181-08		Prepared & Analyzed: 04/14/23						
Surrogate: Dibromofluoromethane	534		ug/L	503.520		106	80-126			
Surrogate: Dibromofluoromethane	534		"	503.520		106	75-136			
Surrogate: 1,2-Dichloroethane-d4	498		"	504.080		98.7	63-138			
Surrogate: 1,2-Dichloroethane-d4	498		"	504.080		98.7	61-142			
Surrogate: Toluene-d8	498		"	502.360		99.1	82-121			
Surrogate: Toluene-d8	498		"	502.360		99.1	87-116			
Surrogate: 4-Bromofluorobenzene	494		"	504.200		98.0	85-111			
Surrogate: 4-Bromofluorobenzene	494		"	504.200		98.0	80-116			
Chloromethane	262.7	10.0	"	300.000	ND	87.6	61-152			
Vinyl Chloride	269.1	10.0	"	300.000	ND	89.7	66-149			
Bromomethane	320.3	10.0	"	300.000	ND	107	43-171			
Chloroethane	320.8	10.0	"	300.000	ND	107	69-148			
Trichlorofluoromethane	297.1	10.0	"	300.000	ND	99.0	62-163			
1,1-Dichloroethylene	530.6	10.0	"	500.000	ND	106	70-148			
Acetone	989.1	100	"	1041.00	ND	95.0	45-173			
Methyl Iodide	1161	10.0	"	1125.63	ND	103	62-167			
Carbon Disulfide	1140	10.0	"	1064.00	ND	107	71-163			
Methylene Chloride	481.3	50.0	"	500.000	ND	96.3	69-140			
Acrylonitrile	964.7	50.0	"	1005.00	ND	96.0	58-151			
trans-1,2-Dichloroethylene	509.0	10.0	"	500.000	ND	102	69-144			

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Determination of Volatile Organic Compounds - Quality Control
Keystone Laboratories - Newton

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0727 - EPA 5030B

Matrix Spike (1GD0727-MS1)	Source: 1GD1181-08			Prepared & Analyzed: 04/14/23						
1,1-Dichloroethane	509.1	10.0	ug/L	500.000	ND	102	70-138			
Vinyl Acetate	880.8	50.0	"	1033.00	ND	85.3	58-142			
cis-1,2-Dichloroethylene	499.0	10.0	"	500.000	ND	99.8	68-151			
2-Butanone (MEK)	907.5	100	"	1062.00	ND	85.5	50-160			
Bromochloromethane	528.9	10.0	"	500.000	ND	106	65-143			
Chloroform	494.3	10.0	"	500.000	ND	98.9	71-143			
1,1,1-Trichloroethane	452.0	10.0	"	499.750	ND	90.4	63-133			
Carbon Tetrachloride	552.3	10.0	"	500.000	ND	110	63-142			
Benzene	488.9	10.0	"	500.000	ND	97.8	69-133			
1,2-Dichloroethane	498.1	10.0	"	500.000	ND	99.6	63-138			
Trichloroethylene	405.6	10.0	"	500.000	ND	81.1	71-133			
1,2-Dichloropropane	494.9	10.0	"	500.000	ND	99.0	69-132			
Dibromomethane	524.3	10.0	"	500.000	ND	105	70-147			
Bromodichloromethane	489.1	10.0	"	500.000	ND	97.8	67-130			
cis-1,3-Dichloropropene	499.4	10.0	"	503.250	ND	99.2	61-126			
4-Methyl-2-pentanone (MIBK)	816.5	50.0	"	1031.00	ND	79.2	55-147			
Toluene	487.5	10.0	"	500.000	ND	97.5	71-133			
trans-1,3-Dichloropropene	489.6	10.0	"	504.250	ND	97.1	63-124			
1,1,2-Trichloroethane	488.9	10.0	"	500.000	ND	97.8	69-133			
Tetrachloroethylene	474.7	10.0	"	500.000	ND	94.9	70-124			
2-Hexanone (MBK)	828.2	50.0	"	1103.00	ND	75.1	53-141			
Dibromochloromethane	540.2	10.0	"	495.000	ND	109	74-122			
1,2-Dibromoethane	506.5	10.0	"	500.000	ND	101	66-127			
Chlorobenzene	487.7	10.0	"	500.000	ND	97.5	76-116			
1,1,1,2-Tetrachloroethane	529.2	10.0	"	500.000	ND	106	77-121			
Ethylbenzene	469.6	10.0	"	500.000	ND	93.9	73-124			
Xylenes, total	1396	20.0	"	1500.00	ND	93.0	75-123			
Styrene	478.2	10.0	"	500.000	ND	95.6	70-120			
Bromoform	564.3	10.0	"	500.000	ND	113	70-124			
1,2,3-Trichloropropane	497.5	10.0	"	500.000	ND	99.5	62-135			
trans-1,4-Dichloro-2-butene	823.9	50.0	"	1024.00	ND	80.5	50-120			
1,1,2,2-Tetrachloroethane	526.9	10.0	"	498.500	ND	106	63-126			
1,4-Dichlorobenzene	482.2	10.0	"	500.000	ND	96.4	72-119			
1,2-Dichlorobenzene	479.1	10.0	"	500.000	ND	95.8	71-117			
1,2-Dibromo-3-chloropropane	414.9	50.0	"	500.000	ND	83.0	49-134			

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Determination of Volatile Organic Compounds - Quality Control
Keystone Laboratories - Newton

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0727 - EPA 5030B

Matrix Spike Dup (1GD0727-MSD1)	Source: 1GD1181-08			Prepared & Analyzed: 04/14/23						
Surrogate: Dibromofluoromethane	529		ug/L	503.520		105	75-136			
Surrogate: Dibromofluoromethane	529		"	503.520		105	80-126			
Surrogate: 1,2-Dichloroethane-d4	496		"	504.080		98.3	61-142			
Surrogate: 1,2-Dichloroethane-d4	496		"	504.080		98.3	63-138			
Surrogate: Toluene-d8	500		"	502.360		99.6	82-121			
Surrogate: Toluene-d8	500		"	502.360		99.6	87-116			
Surrogate: 4-Bromofluorobenzene	488		"	504.200		96.8	85-111			
Surrogate: 4-Bromofluorobenzene	488		"	504.200		96.8	80-116			
Chloromethane	259.5	10.0	"	300.000	ND	86.5	61-152	1.23	26	
Vinyl Chloride	265.6	10.0	"	300.000	ND	88.5	66-149	1.31	23	
Bromomethane	339.4	10.0	"	300.000	ND	113	43-171	5.79	29	
Chloroethane	316.3	10.0	"	300.000	ND	105	69-148	1.41	25	
Trichlorofluoromethane	299.8	10.0	"	300.000	ND	99.9	62-163	0.905	25	
1,1-Dichloroethylene	532.8	10.0	"	500.000	ND	107	70-148	0.414	22	
Acetone	989.9	100	"	1041.00	ND	95.1	45-173	0.0809	30	
Methyl Iodide	1276	10.0	"	1125.63	ND	113	62-167	9.45	24	
Carbon Disulfide	1159	10.0	"	1064.00	ND	109	71-163	1.69	22	
Methylene Chloride	475.8	50.0	"	500.000	ND	95.2	69-140	1.15	19	
Acrylonitrile	957.4	50.0	"	1005.00	ND	95.3	58-151	0.760	15	
trans-1,2-Dichloroethylene	509.8	10.0	"	500.000	ND	102	69-144	0.157	22	
1,1-Dichloroethane	507.1	10.0	"	500.000	ND	101	70-138	0.394	20	
Vinyl Acetate	821.2	50.0	"	1033.00	ND	79.5	58-142	7.00	24	
cis-1,2-Dichloroethylene	498.6	10.0	"	500.000	ND	99.7	68-151	0.0802	22	
2-Butanone (MEK)	885.2	100	"	1062.00	ND	83.4	50-160	2.49	23	
Bromochloromethane	511.3	10.0	"	500.000	ND	102	65-143	3.38	22	
Chloroform	490.7	10.0	"	500.000	ND	98.1	71-143	0.731	21	
1,1,1-Trichloroethane	461.4	10.0	"	499.750	ND	92.3	63-133	2.06	23	
Carbon Tetrachloride	576.2	10.0	"	500.000	ND	115	63-142	4.24	22	
Benzene	498.2	10.0	"	500.000	ND	99.6	69-133	1.88	18	
1,2-Dichloroethane	484.4	10.0	"	500.000	ND	96.9	63-138	2.79	20	
Trichloroethylene	412.8	10.0	"	500.000	ND	82.6	71-133	1.76	23	
1,2-Dichloropropane	491.3	10.0	"	500.000	ND	98.3	69-132	0.730	20	
Dibromomethane	520.1	10.0	"	500.000	ND	104	70-147	0.804	22	
Bromodichloromethane	480.8	10.0	"	500.000	ND	96.2	67-130	1.71	21	
cis-1,3-Dichloropropene	491.8	10.0	"	503.250	ND	97.7	61-126	1.53	21	
4-Methyl-2-pentanone (MIBK)	827.2	50.0	"	1031.00	ND	80.2	55-147	1.30	23	
Toluene	495.4	10.0	"	500.000	ND	99.1	71-133	1.61	19	
trans-1,3-Dichloropropene	482.9	10.0	"	504.250	ND	95.8	63-124	1.38	21	

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Determination of Volatile Organic Compounds - Quality Control
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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0727 - EPA 5030B

Matrix Spike Dup (1GD0727-MSD1)	Source: 1GD1181-08			Prepared & Analyzed: 04/14/23						
1,1,2-Trichloroethane	476.7	10.0	ug/L	500.000	ND	95.3	69-133	2.53	19	
Tetrachloroethylene	489.3	10.0	"	500.000	ND	97.9	70-124	3.03	24	
2-Hexanone (MBK)	841.5	50.0	"	1103.00	ND	76.3	53-141	1.59	24	
Dibromochloromethane	533.3	10.0	"	495.000	ND	108	74-122	1.29	21	
1,2-Dibromoethane	496.1	10.0	"	500.000	ND	99.2	66-127	2.07	23	
Chlorobenzene	487.4	10.0	"	500.000	ND	97.5	76-116	0.0615	21	
1,1,1,2-Tetrachloroethane	533.4	10.0	"	500.000	ND	107	77-121	0.791	25	
Ethylbenzene	478.1	10.0	"	500.000	ND	95.6	73-124	1.79	20	
Xylenes, total	1412	20.0	"	1500.00	ND	94.1	75-123	1.18	20	
Styrene	479.2	10.0	"	500.000	ND	95.8	70-120	0.209	23	
Bromoform	565.5	10.0	"	500.000	ND	113	70-124	0.212	22	
1,2,3-Trichloropropane	496.3	10.0	"	500.000	ND	99.3	62-135	0.241	28	
trans-1,4-Dichloro-2-butene	819.4	50.0	"	1024.00	ND	80.0	50-120	0.548	26	
1,1,2,2-Tetrachloroethane	523.0	10.0	"	498.500	ND	105	63-126	0.743	24	
1,4-Dichlorobenzene	493.8	10.0	"	500.000	ND	98.8	72-119	2.38	24	
1,2-Dichlorobenzene	488.8	10.0	"	500.000	ND	97.8	71-117	2.00	24	
1,2-Dibromo-3-chloropropane	438.0	50.0	"	500.000	ND	87.6	49-134	5.42	28	

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Determination of Total Metals - Quality Control
Keystone Laboratories - Newton

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0854 - EPA 3005A Total Recoverable Metals

Blank (1GD0854-BLK1)

Prepared: 04/17/23 Analyzed: 04/19/23

Antimony, total	ND	0.0020	mg/L							
Arsenic, total	ND	0.0040	"							
Barium, total	ND	0.0040	"							
Beryllium, total	ND	0.0040	"							
Cadmium, total	ND	0.0008	"							
Chromium, total	ND	0.0080	"							
Cobalt, total	ND	0.0004	"							
Copper, total	ND	0.0040	"							
Lead, total	ND	0.0040	"							
Nickel, total	ND	0.0040	"							
Selenium, total	ND	0.0040	"							
Silver, total	ND	0.0040	"							
Thallium, total	ND	0.0020	"							
Vanadium, total	ND	0.0200	"							QB-12
Zinc, total	ND	0.0200	"							

LCS (1GD0854-BS1)

Prepared: 04/17/23 Analyzed: 04/19/23

Antimony, total	0.0944	0.0020	mg/L	0.100000	94.4	80-120
Arsenic, total	0.0949	0.0040	"	0.100000	94.9	80-120
Barium, total	0.0982	0.0040	"	0.100000	98.2	80-120
Beryllium, total	0.0980	0.0040	"	0.100000	98.0	80-120
Cadmium, total	0.0956	0.0008	"	0.100000	95.6	80-120
Chromium, total	0.0935	0.0080	"	0.100000	93.5	80-120
Cobalt, total	0.0978	0.0004	"	0.100000	97.8	80-120
Copper, total	0.0982	0.0040	"	0.100000	98.2	80-120
Lead, total	0.0940	0.0040	"	0.100000	94.0	80-120
Nickel, total	0.0984	0.0040	"	0.100000	98.4	80-120
Selenium, total	0.0951	0.0040	"	0.100000	95.1	80-120
Silver, total	0.0974	0.0040	"	0.100000	97.4	80-120
Thallium, total	0.0864	0.0020	"	0.100000	86.4	80-120
Vanadium, total	0.105	0.0200	"	0.100000	105	80-120
Zinc, total	0.0979	0.0200	"	0.100000	97.9	80-120

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Samples were preserved in accordance with 40 CFR for pH adjustment unless otherwise noted. MRL= Method Reporting Limit.

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Work Order: 1GD0990

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Determination of Total Metals - Quality Control
Keystone Laboratories - Newton

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0854 - EPA 3005A Total Recoverable Metals

Matrix Spike (1GD0854-MS1)	Source: 1GD1181-01			Prepared: 04/17/23 Analyzed: 04/19/23						
Antimony, total	0.0704	0.0020	mg/L	0.100000	0.0005	70.4	75-125			QM-07
Arsenic, total	0.139	0.0040	"	0.100000	0.0385	100	75-125			
Barium, total	0.283	0.0040	"	0.100000	0.173	110	75-125			
Beryllium, total	0.0916	0.0040	"	0.100000	0.0005	91.1	75-125			
Cadmium, total	0.0883	0.0008	"	0.100000	0.0004	87.9	75-125			
Chromium, total	0.102	0.0080	"	0.100000	0.0091	92.9	75-125			
Cobalt, total	0.102	0.0004	"	0.100000	0.0049	97.5	75-125			
Copper, total	0.0965	0.0040	"	0.100000	0.0163	80.2	75-125			
Lead, total	0.0921	0.0040	"	0.100000	0.0051	87.0	75-125			
Nickel, total	0.115	0.0040	"	0.100000	0.0224	92.9	75-125			
Selenium, total	0.0944	0.0040	"	0.100000	0.0021	92.3	75-125			
Silver, total	0.0904	0.0040	"	0.100000	ND	90.4	75-125			
Thallium, total	0.0927	0.0020	"	0.100000	0.0002	92.5	75-125			
Vanadium, total	0.112	0.0200	"	0.100000	0.0174	94.5	75-125			
Zinc, total	0.150	0.0200	"	0.100000	0.0693	81.0	75-125			

Matrix Spike Dup (1GD0854-MSD1)	Source: 1GD1181-01			Prepared: 04/17/23 Analyzed: 04/19/23						
Antimony, total	0.0694	0.0020	mg/L	0.100000	0.0005	69.4	75-125	1.39	20	QM-07
Arsenic, total	0.140	0.0040	"	0.100000	0.0385	102	75-125	1.01	20	
Barium, total	0.292	0.0040	"	0.100000	0.173	119	75-125	2.87	20	
Beryllium, total	0.0913	0.0040	"	0.100000	0.0005	90.9	75-125	0.245	20	
Cadmium, total	0.0883	0.0008	"	0.100000	0.0004	87.9	75-125	0.0322	20	
Chromium, total	0.102	0.0080	"	0.100000	0.0091	92.8	75-125	0.0749	20	
Cobalt, total	0.103	0.0004	"	0.100000	0.0049	98.6	75-125	1.06	20	
Copper, total	0.0989	0.0040	"	0.100000	0.0163	82.7	75-125	2.49	20	
Lead, total	0.0936	0.0040	"	0.100000	0.0051	88.5	75-125	1.56	20	
Nickel, total	0.117	0.0040	"	0.100000	0.0224	94.6	75-125	1.49	20	
Selenium, total	0.0954	0.0040	"	0.100000	0.0021	93.3	75-125	1.05	20	
Silver, total	0.0913	0.0040	"	0.100000	ND	91.3	75-125	1.02	20	
Thallium, total	0.0923	0.0020	"	0.100000	0.0002	92.1	75-125	0.352	20	
Vanadium, total	0.112	0.0200	"	0.100000	0.0174	94.4	75-125	0.115	20	
Zinc, total	0.152	0.0200	"	0.100000	0.0693	83.0	75-125	1.33	20	

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Work Order: 1GD0990

Determination of Total Metals - Quality Control
Keystone Laboratories - Newton

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GD0854 - EPA 3005A Total Recoverable Metals

Post Spike (1GD0854-PS1)	Source: 1GD1181-01			Prepared: 04/17/23 Analyzed: 04/19/23						
Antimony, total	0.0792		mg/L	0.0800000	0.0005	98.4	80-120			
Arsenic, total	0.122		"	0.0800000	0.0377	105	80-120			
Barium, total	0.255		"	0.0800000	0.169	107	80-120			
Beryllium, total	0.0771		"	0.0800000	0.0004	95.9	80-120			
Cadmium, total	0.0726		"	0.0800000	0.0003	90.3	80-120			
Chromium, total	0.0839		"	0.0800000	0.0089	93.7	80-120			
Cobalt, total	0.0868		"	0.0800000	0.0048	103	80-120			
Copper, total	0.0863		"	0.0800000	0.0159	88.0	80-120			
Lead, total	0.0770		"	0.0800000	0.0050	89.9	80-120			
Nickel, total	0.103		"	0.0800000	0.0219	101	80-120			
Selenium, total	0.0819		"	0.0800000	0.0021	99.8	80-120			
Silver, total	0.0766		"	0.0800000	0.0009	94.6	80-120			
Thallium, total	0.0709		"	0.0800000	0.0002	88.4	80-120			
Vanadium, total	0.0959		"	0.0800000	0.0171	98.5	80-120			
Zinc, total	0.137		"	0.0800000	0.0679	86.8	80-120			

ND = Non Detect; REC= Recovery; RPD= Relative Percent Difference

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Work Order: 1GD0990

Certified Analyses Included In This Report

Method/Matrix	Analyte	Certifications
EPA 6020A in Water		
	Antimony, total	SIA1X,KS-NT
	Arsenic, total	SIA1X,KS-NT
	Barium, total	SIA1X,KS-NT
	Beryllium, total	SIA1X,KS-NT
	Cadmium, total	SIA1X,KS-NT
	Chromium, total	SIA1X,KS-NT
	Cobalt, total	SIA1X,KS-NT
	Copper, total	SIA1X,KS-NT
	Lead, total	SIA1X,KS-NT
	Nickel, total	SIA1X,KS-NT
	Selenium, total	SIA1X,KS-NT
	Silver, total	SIA1X,KS-NT
	Thallium, total	SIA1X,KS-NT
	Vanadium, total	SIA1X,KS-NT
	Zinc, total	SIA1X,KS-NT
EPA 8260B in Water		
	Chloromethane	KS-NT,SIA1X
	Vinyl Chloride	KS-NT,SIA1X
	Bromomethane	KS-NT,SIA1X
	Chloroethane	KS-NT,SIA1X
	Trichlorofluoromethane	KS-NT,SIA1X
	1,1-Dichloroethylene	KS-NT,SIA1X
	Acetone	KS-NT,SIA1X
	Methyl Iodide	SIA1X
	Carbon Disulfide	KS-NT,SIA1X
	Methylene Chloride	KS-NT,SIA1X
	Acrylonitrile	KS-NT,SIA1X
	trans-1,2-Dichloroethylene	KS-NT,SIA1X
	1,1-Dichloroethane	KS-NT,SIA1X
	Vinyl Acetate	KS-NT,SIA1X
	cis-1,2-Dichloroethylene	KS-NT,SIA1X
	2-Butanone (MEK)	KS-NT,SIA1X
	Bromochloromethane	KS-NT,SIA1X
	Chloroform	KS-NT,SIA1X
	1,1,1-Trichloroethane	KS-NT,SIA1X
	Carbon Tetrachloride	KS-NT,SIA1X
	Benzene	KS-NT,SIA1X
	1,2-Dichloroethane	KS-NT,SIA1X
	Trichloroethylene	KS-NT,SIA1X
	1,2-Dichloropropane	KS-NT,SIA1X
	Dibromomethane	SIA1X
	Bromodichloromethane	KS-NT,SIA1X
	cis-1,3-Dichloropropene	KS-NT,SIA1X
	4-Methyl-2-pentanone (MIBK)	KS-NT,SIA1X
	Toluene	KS-NT,SIA1X
	trans-1,3-Dichloropropene	KS-NT,SIA1X

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Samples were preserved in accordance with 40 CFR for pH adjustment unless otherwise noted. MRL= Method Reporting Limit.

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April 27, 2023
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Work Order: 1GD0990

1,1,2-Trichloroethane	KS-NT,SIA1X
Tetrachloroethylene	KS-NT,SIA1X
2-Hexanone (MBK)	KS-NT,SIA1X
Dibromochloromethane	KS-NT,SIA1X
1,2-Dibromoethane	KS-NT,SIA1X
Chlorobenzene	KS-NT,SIA1X
1,1,1,2-Tetrachloroethane	KS-NT,SIA1X
Ethylbenzene	KS-NT,SIA1X
Xylenes, total	KS-NT,SIA1X
Styrene	KS-NT,SIA1X
Bromoform	KS-NT,SIA1X
1,2,3-Trichloropropane	KS-NT,SIA1X
trans-1,4-Dichloro-2-butene	SIA1X
1,1,2,2-Tetrachloroethane	KS-NT,SIA1X
1,4-Dichlorobenzene	KS-NT,SIA1X
1,2-Dichlorobenzene	KS-NT,SIA1X
1,2-Dibromo-3-chloropropane	KS-NT,SIA1X

Code	Description	Number	Expires
KS-KC	Kansas Department of Health and Environment-KC	E-10110	04/30/2023
KS-NT	Kansas Department of Health and Environment (NELAP)	E-10287	10/31/2023
MO-KC	Missouri Department of Natural Resources (KC)	140	04/30/2023
MO-NT	Missouri Department of Natural Resources (Newton)	10170	04/30/2026
SIA1X	Iowa Dept. of Natural Resources	95	02/01/2024

Notes and Definitions

QB-12	The analyte was found in the blank at a concentration greater than one-half the reporting limit. However, the concentration of the analyte in the blank was less than the reporting limit so the data was accepted.
QM-07	The spike recovery and/or RPD was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

End of Report

Sue Thompson

Keystone Laboratories

Sue Thompson
Client Services Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety. Samples were preserved in accordance with 40 CFR for pH adjustment unless otherwise noted. MRL= Method Reporting Limit.



SITE INFORMATION

Sampler: TODD WHIPPLE

Project: Marshall Sanitary Landfill-New Regs
6003

SPECIAL INSTRUCTIONS

None

Turn Around Time

☐ Standard ☐ RUSH, need by ___/___/___

REPORT TO

Todd Whipple
HLW Engineering
PO Box 314
Story City, IA 50248

INVOICE TO

Don Baliaatak
Marshall County Landfill
2313 Marshalltown Blvd
Marshalltown, IA 50158

LAB USE ONLY

Work Order 1GD0990

Temperature 2.1

Turn-Cooler: No

☐ Custody Seal
☒ Containers Intact
☒ COC/Labels Agree
☒ Preservation Confirmed
☒ Received on Ice

Number	Sample Identification / Client ID	Matrix	Sample Type	Date	Time	Number of Containers	Analyses	Lab Sample Number
02-001	MW-213	Water	GRAB	<u>4/10/23</u>	<u>7:20</u>	<u>7</u>	Indfill-app1-voc-group Indfill-app1-metals-6020	<u>01</u>

Relinquished By [Signature] Date/Time 4/11/23

Received By _____ Date/Time _____

Relinquished By _____ Date/Time _____

Received for Lab By [Signature] Date/Time 4-11-23 9:23

Original - Lab Copy Yellow - Sampler Copy

Remarks:



Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Project Description

Marshall Sanitary Landfill-New Regs

For:

Todd Whipple

HLW Engineering

PO Box 314

Story City, IA 50248

A handwritten signature in black ink that reads "Heather Murphy". The signature is written in a cursive style with a horizontal line underneath the name.

Heather Murphy

Customer Relationship Specialist

Thursday, November 2, 2023

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Keystone Laboratories - Newton. If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed above.

I certify that all test results meet all of the requirements of the accrediting authority listed within this report. Analytical results are reported on a 'as received' basis unless specified otherwise. Analytical results for solids with units ending in (dry) are reported on a dry weight basis. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

Microbac Laboratories, Inc.

600 East 17th Street South | Newton, IA 50208 | 641-792-8451 p | www.microbac.com



Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

HLW Engineering

Todd Whipple
PO Box 314
Story City, IA 50248

Project Name: Marshall Sanitary Landfill-New

Regs
Project / PO Number: / 6003
Received: 10/17/2023
Reported: 11/02/2023

Sample Summary Report

<u>Sample Name</u>	<u>Laboratory ID</u>	<u>Client Matrix</u>	<u>Sample Type</u>	<u>Sample Begin</u>	<u>Sample Taken</u>	<u>Lab Received</u>
MW-213	1GJ1470-01	Water	GRAB		10/13/23 10:50	10/17/23 11:00

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Analytical Testing Parameters

Client Sample ID:	MW-213	Collected By:	Whipple, Todd
Sample Matrix:	Water	Collection Date:	10/13/2023 10:50
Lab Sample ID:	1GJ1470-01		

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 5030B/EPA 8260B								
Chloromethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Vinyl Chloride	4.3	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Bromomethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Chloroethane	4.2	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Trichlorofluoromethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Acetone	<10.0	10.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Methyl Iodide	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Carbon Disulfide	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Methylene Chloride	<5.0	5.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Acrylonitrile	<5.0	5.0	ug/L	1		10/20/23 0000	10/20/23 1259	LNH
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,1-Dichloroethane	3.2	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Vinyl Acetate	<5.0	5.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
cis-1,2-Dichloroethylene	32.6	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
2-Butanone (MEK)	<10.0	10.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Bromochloromethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Chloroform	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Carbon Tetrachloride	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Benzene	1.4	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,2-Dichloroethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Trichloroethylene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,2-Dichloropropane	4.1	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Dibromomethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Bromodichloromethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Toluene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Tetrachloroethylene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Dibromochloromethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,2-Dibromoethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Chlorobenzene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Ethylbenzene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Xylenes, total	<2.0	2.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Styrene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Client Sample ID: MW-213
Sample Matrix: Water
Lab Sample ID: 1GJ1470-01

Collected By: Whipple, Todd
Collection Date: 10/13/2023 10:50

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
Bromoform	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
trans-1,4-Dichloro-2-butene	<5.0	5.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,4-Dichlorobenzene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		10/19/23 0000	10/19/23 1412	LJS
Surrogate: Dibromofluoromethane	92.5	Limit: 80-126	% Rec	1		10/20/23 0000	10/20/23 1259	LNH
Surrogate: Dibromofluoromethane	112	Limit: 75-136	% Rec	1		10/19/23 0000	10/19/23 1412	LJS
Surrogate: 1,2-Dichloroethane-d4	104	Limit: 61-142	% Rec	1		10/19/23 0000	10/19/23 1412	LJS
Surrogate: 1,2-Dichloroethane-d4	102	Limit: 63-138	% Rec	1		10/20/23 0000	10/20/23 1259	LNH
Surrogate: Toluene-d8	101	Limit: 87-116	% Rec	1		10/20/23 0000	10/20/23 1259	LNH
Surrogate: Toluene-d8	103	Limit: 82-121	% Rec	1		10/19/23 0000	10/19/23 1412	LJS
Surrogate: 4-Bromofluorobenzene	112	Limit: 80-116	% Rec	1		10/19/23 0000	10/19/23 1412	LJS
Surrogate: 4-Bromofluorobenzene	102	Limit: 85-111	% Rec	1		10/20/23 0000	10/20/23 1259	LNH

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Batch Log Summary

Method	Batch	Laboratory ID	Client / Source ID
EPA 8260B	1GJ1243	1GJ1243-BS1	
		1GJ1243-BSD1	
		1GJ1243-BLK1	
		1GJ1470-01	MW-213
		1GJ1243-MS1	1GJ1446-01
		1GJ1243-MSD1	1GJ1446-01
Method	Batch	Laboratory ID	Client / Source ID
EPA 8260B	1GJ1371	1GJ1371-BS1	
		1GJ1371-BSD1	
		1GJ1371-BLK1	
		1GJ1470-01	MW-213
		1GJ1371-MSD1	1GJ1590-01
		1GJ1371-MS1	1GJ1590-01

Batch Quality Control Summary: Keystone Laboratories - Newton

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1GJ1243 - EPA 5030B - EPA 8260B

Blank (1GJ1243-BLK1)

Prepared: 10/19/23 00:00 Analyzed: 10/19/23 12:25

Chloromethane	<1.0	1.0	ug/L
Vinyl Chloride	<1.0	1.0	ug/L
Bromomethane	<1.0	1.0	ug/L
Chloroethane	<1.0	1.0	ug/L
Trichlorofluoromethane	<1.0	1.0	ug/L
1,1-Dichloroethylene	<1.0	1.0	ug/L
Acetone	<10.0	10.0	ug/L
Methyl Iodide	<1.0	1.0	ug/L
Carbon Disulfide	<1.0	1.0	ug/L
Methylene Chloride	<5.0	5.0	ug/L
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L
1,1-Dichloroethane	<1.0	1.0	ug/L
Vinyl Acetate	<5.0	5.0	ug/L
cis-1,2-Dichloroethylene	<1.0	1.0	ug/L
2-Butanone (MEK)	<10.0	10.0	ug/L
Bromochloromethane	<1.0	1.0	ug/L
Chloroform	<1.0	1.0	ug/L
1,1,1-Trichloroethane	<1.0	1.0	ug/L
Carbon Tetrachloride	<1.0	1.0	ug/L
Benzene	<1.0	1.0	ug/L
1,2-Dichloroethane	<1.0	1.0	ug/L
Trichloroethylene	<1.0	1.0	ug/L

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1243 - EPA 5030B - EPA 8260B										

Blank (1GJ1243-BLK1)

Prepared: 10/19/23 00:00 Analyzed: 10/19/23 12:25

1,2-Dichloropropane	<1.0	1.0	ug/L							
Dibromomethane	<1.0	1.0	ug/L							
Bromodichloromethane	<1.0	1.0	ug/L							
cis-1,3-Dichloropropene	<1.0	1.0	ug/L							
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L							
Toluene	<1.0	1.0	ug/L							
trans-1,3-Dichloropropene	<1.0	1.0	ug/L							
1,1,2-Trichloroethane	<1.0	1.0	ug/L							
Tetrachloroethylene	<1.0	1.0	ug/L							
2-Hexanone (MBK)	<5.0	5.0	ug/L							
Dibromochloromethane	<1.0	1.0	ug/L							
1,2-Dibromoethane	<1.0	1.0	ug/L							
Chlorobenzene	<1.0	1.0	ug/L							
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L							
Ethylbenzene	<1.0	1.0	ug/L							
Xylenes, total	<2.0	2.0	ug/L							
Styrene	<1.0	1.0	ug/L							
Bromoform	<1.0	1.0	ug/L							
1,2,3-Trichloropropane	<1.0	1.0	ug/L							
trans-1,4-Dichloro-2-butene	<5.0	5.0	ug/L							
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L							
1,4-Dichlorobenzene	<1.0	1.0	ug/L							
1,2-Dichlorobenzene	<1.0	1.0	ug/L							
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L							

Surrogate: Dibromofluoromethane	56.1		ug/L	50.4	111	75-136
Surrogate: 1,2-Dichloroethane-d4	51.4		ug/L	50.4	102	61-142
Surrogate: Toluene-d8	51.6		ug/L	50.2	103	82-121
Surrogate: 4-Bromofluorobenzene	55.7		ug/L	50.4	110	80-116

LCS (1GJ1243-BS1)

Prepared: 10/19/23 00:00 Analyzed: 10/19/23 11:05

Chloromethane	33.65	1.0	ug/L	30.0	112	63-155
Vinyl Chloride	35.22	1.0	ug/L	30.0	117	70-154
Bromomethane	38.85	1.0	ug/L	30.0	130	52-176
Chloroethane	36.31	1.0	ug/L	30.0	121	72-148
Trichlorofluoromethane	33.56	1.0	ug/L	30.0	112	70-152
1,1-Dichloroethylene	56.32	1.0	ug/L	50.0	113	70-148
Acetone	105.6	10.0	ug/L	102	103	43-172
Methyl Iodide	119.1	1.0	ug/L	99.7	119	69-170
Carbon Disulfide	104.9	1.0	ug/L	101	104	72-162
Methylene Chloride	46.32	5.0	ug/L	50.0	92.6	68-142
trans-1,2-Dichloroethylene	52.30	1.0	ug/L	50.0	105	66-148
1,1-Dichloroethane	50.38	1.0	ug/L	50.0	101	66-143
Vinyl Acetate	69.85	5.0	ug/L	102	68.5	43-153

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1243 - EPA 5030B - EPA 8260B										
LCS (1GJ1243-BS1)										
				Prepared: 10/19/23 00:00 Analyzed: 10/19/23 11:05						
cis-1,2-Dichloroethylene	56.69	1.0	ug/L	49.5		115	71-149			
2-Butanone (MEK)	104.4	10.0	ug/L	103		101	52-159			
Bromochloromethane	50.28	1.0	ug/L	50.0		101	69-143			
Chloroform	50.72	1.0	ug/L	50.0		101	69-144			
1,1,1-Trichloroethane	47.69	1.0	ug/L	50.0		95.4	62-129			
Carbon Tetrachloride	53.99	1.0	ug/L	50.0		108	63-141			
Benzene	53.73	1.0	ug/L	50.0		107	71-134			
1,2-Dichloroethane	46.93	1.0	ug/L	50.0		93.9	72-132			
Trichloroethylene	52.76	1.0	ug/L	50.0		106	71-135			
1,2-Dichloropropane	53.23	1.0	ug/L	50.0		106	69-136			
Dibromomethane	55.86	1.0	ug/L	50.0		112	73-147			
Bromodichloromethane	50.40	1.0	ug/L	50.0		101	68-129			
cis-1,3-Dichloropropene	50.56	1.0	ug/L	50.3		100	65-134			
4-Methyl-2-pentanone (MIBK)	99.85	5.0	ug/L	101		98.5	58-147			
Toluene	50.70	1.0	ug/L	50.0		101	72-133			
trans-1,3-Dichloropropene	46.26	1.0	ug/L	50.4		91.7	67-130			
1,1,2-Trichloroethane	48.94	1.0	ug/L	50.0		97.9	69-135			
Tetrachloroethylene	54.22	1.0	ug/L	50.0		108	69-130			
2-Hexanone (MBK)	105.2	5.0	ug/L	103		102	55-144			
Dibromochloromethane	50.71	1.0	ug/L	49.5		102	73-127			
1,2-Dibromoethane	50.57	1.0	ug/L	50.0		101	67-132			
Chlorobenzene	52.16	1.0	ug/L	50.0		104	72-123			
1,1,1,2-Tetrachloroethane	51.73	1.0	ug/L	50.0		103	73-127			
Ethylbenzene	53.57	1.0	ug/L	50.0		107	71-127			
Xylenes, total	154.6	2.0	ug/L	150		103	74-127			
Styrene	52.49	1.0	ug/L	50.0		105	66-126			
Bromoform	55.17	1.0	ug/L	50.0		110	68-130			
1,2,3-Trichloropropane	54.17	1.0	ug/L	50.0		108	63-136			
trans-1,4-Dichloro-2-butene	104.1	5.0	ug/L	104		100	54-134			
1,1,2,2-Tetrachloroethane	54.60	1.0	ug/L	49.8		110	61-131			
1,4-Dichlorobenzene	54.29	1.0	ug/L	50.0		109	70-129			
1,2-Dichlorobenzene	53.61	1.0	ug/L	50.0		107	69-126			
1,2-Dibromo-3-chloropropane	60.87	5.0	ug/L	50.0		122	50-143			
Surrogate: Dibromofluoromethane	46.7		ug/L	50.4		92.8	75-136			
Surrogate: 1,2-Dichloroethane-d4	49.1		ug/L	50.4		97.3	61-142			
Surrogate: Toluene-d8	48.6		ug/L	50.2		96.8	82-121			
Surrogate: 4-Bromofluorobenzene	47.7		ug/L	50.4		94.5	80-116			
LCS Dup (1GJ1243-BS1)										
				Prepared: 10/19/23 00:00 Analyzed: 10/19/23 11:32						
Chloromethane	33.26	1.0	ug/L	30.0		111	63-155	1.17	24	
Vinyl Chloride	34.64	1.0	ug/L	30.0		115	70-154	1.66	25	
Bromomethane	38.82	1.0	ug/L	30.0		129	52-176	0.0772	27	
Chloroethane	35.23	1.0	ug/L	30.0		117	72-148	3.02	25	

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1243 - EPA 5030B - EPA 8260B										
LCS Dup (1GJ1243-BSD1)				Prepared: 10/19/23 00:00 Analyzed: 10/19/23 11:32						
Trichlorofluoromethane	32.33	1.0	ug/L	30.0		108	70-152	3.73	26	
1,1-Dichloroethylene	55.87	1.0	ug/L	50.0		112	70-148	0.802	24	
Acetone	106.0	10.0	ug/L	102		104	43-172	0.463	30	
Methyl Iodide	119.0	1.0	ug/L	99.7		119	69-170	0.0840	30	
Carbon Disulfide	103.1	1.0	ug/L	101		102	72-162	1.76	24	
Methylene Chloride	46.73	5.0	ug/L	50.0		93.5	68-142	0.881	21	
trans-1,2-Dichloroethylene	51.80	1.0	ug/L	50.0		104	66-148	0.961	27	
1,1-Dichloroethane	50.25	1.0	ug/L	50.0		100	66-143	0.258	24	
Vinyl Acetate	73.74	5.0	ug/L	102		72.4	43-153	5.42	30	
cis-1,2-Dichloroethylene	56.89	1.0	ug/L	49.5		115	71-149	0.352	26	
2-Butanone (MEK)	100.4	10.0	ug/L	103		97.2	52-159	3.92	27	
Bromochloromethane	50.97	1.0	ug/L	50.0		102	69-143	1.36	23	
Chloroform	51.16	1.0	ug/L	50.0		102	69-144	0.864	23	
1,1,1-Trichloroethane	47.80	1.0	ug/L	50.0		95.6	62-129	0.230	24	
Carbon Tetrachloride	53.72	1.0	ug/L	50.0		107	63-141	0.501	25	
Benzene	53.14	1.0	ug/L	50.0		106	71-134	1.10	24	
1,2-Dichloroethane	47.97	1.0	ug/L	50.0		95.9	72-132	2.19	24	
Trichloroethylene	52.05	1.0	ug/L	50.0		104	71-135	1.35	24	
1,2-Dichloropropane	52.72	1.0	ug/L	50.0		105	69-136	0.963	24	
Dibromomethane	55.75	1.0	ug/L	50.0		112	73-147	0.197	25	
Bromodichloromethane	50.62	1.0	ug/L	50.0		101	68-129	0.436	22	
cis-1,3-Dichloropropene	50.18	1.0	ug/L	50.3		99.7	65-134	0.754	23	
4-Methyl-2-pentanone (MIBK)	96.52	5.0	ug/L	101		95.2	58-147	3.39	27	
Toluene	49.57	1.0	ug/L	50.0		99.1	72-133	2.25	24	
trans-1,3-Dichloropropene	44.64	1.0	ug/L	50.4		88.5	67-130	3.56	24	
1,1,2-Trichloroethane	47.98	1.0	ug/L	50.0		96.0	69-135	1.98	23	
Tetrachloroethylene	52.13	1.0	ug/L	50.0		104	69-130	3.93	25	
2-Hexanone (MBK)	100.8	5.0	ug/L	103		97.6	55-144	4.32	25	
Dibromochloromethane	49.76	1.0	ug/L	49.5		101	73-127	1.89	22	
1,2-Dibromoethane	49.06	1.0	ug/L	50.0		98.1	67-132	3.03	24	
Chlorobenzene	50.51	1.0	ug/L	50.0		101	72-123	3.21	23	
1,1,1,2-Tetrachloroethane	50.23	1.0	ug/L	50.0		100	73-127	2.94	24	
Ethylbenzene	52.17	1.0	ug/L	50.0		104	71-127	2.65	26	
Xylenes, total	151.4	2.0	ug/L	150		101	74-127	2.10	25	
Styrene	51.96	1.0	ug/L	50.0		104	66-126	1.01	23	
Bromoform	54.95	1.0	ug/L	50.0		110	68-130	0.400	23	
1,2,3-Trichloropropane	53.91	1.0	ug/L	50.0		108	63-136	0.481	24	
trans-1,4-Dichloro-2-butene	104.2	5.0	ug/L	104		100	54-134	0.0960	27	
1,1,2,2-Tetrachloroethane	53.74	1.0	ug/L	49.8		108	61-131	1.59	29	
1,4-Dichlorobenzene	52.46	1.0	ug/L	50.0		105	70-129	3.43	24	
1,2-Dichlorobenzene	52.36	1.0	ug/L	50.0		105	69-126	2.36	26	
1,2-Dibromo-3-chloropropane	58.73	5.0	ug/L	50.0		117	50-143	3.58	30	

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1243 - EPA 5030B - EPA 8260B										

LCS Dup (1GJ1243-BSD1)

Prepared: 10/19/23 00:00 Analyzed: 10/19/23 11:32

Surrogate: Dibromofluoromethane	48.3		ug/L	50.4		96.0	75-136
Surrogate: 1,2-Dichloroethane-d4	49.7		ug/L	50.4		98.6	61-142
Surrogate: Toluene-d8	48.2		ug/L	50.2		96.0	82-121
Surrogate: 4-Bromofluorobenzene	47.4		ug/L	50.4		94.0	80-116

Matrix Spike (1GJ1243-MS1)

Source: 1GJ1446-01

Prepared: 10/19/23 00:00 Analyzed: 10/19/23 21:45

Chloromethane	300.6	10.0	ug/L	300	ND	100	61-152
Vinyl Chloride	303.0	10.0	ug/L	300	ND	101	66-149
Bromomethane	284.2	10.0	ug/L	300	ND	94.7	43-171
Chloroethane	277.0	10.0	ug/L	300	ND	92.3	69-148
Trichlorofluoromethane	293.5	10.0	ug/L	300	ND	97.8	62-163
1,1-Dichloroethylene	518.6	10.0	ug/L	500	ND	104	70-148
Acetone	1109	100	ug/L	1020	ND	109	45-173
Methyl Iodide	924.6	10.0	ug/L	997	ND	92.7	62-167
Carbon Disulfide	1008	10.0	ug/L	1010	ND	99.8	71-163
Methylene Chloride	468.4	50.0	ug/L	500	ND	93.7	69-140
trans-1,2-Dichloroethylene	508.6	10.0	ug/L	500	ND	102	69-144
1,1-Dichloroethane	501.7	10.0	ug/L	500	ND	100	70-138
Vinyl Acetate	876.0	50.0	ug/L	1020	ND	86.0	58-142
cis-1,2-Dichloroethylene	533.1	10.0	ug/L	495	ND	108	68-151
2-Butanone (MEK)	1008	100	ug/L	1030	ND	97.6	50-160
Bromochloromethane	489.5	10.0	ug/L	500	ND	97.9	65-143
Chloroform	493.0	10.0	ug/L	500	ND	98.6	71-143
1,1,1-Trichloroethane	504.7	10.0	ug/L	500	ND	101	63-133
Carbon Tetrachloride	520.8	10.0	ug/L	500	ND	104	63-142
Benzene	549.6	10.0	ug/L	500	ND	110	69-133
1,2-Dichloroethane	502.1	10.0	ug/L	500	ND	100	63-138
Trichloroethylene	538.9	10.0	ug/L	500	ND	108	71-133
1,2-Dichloropropane	546.7	10.0	ug/L	500	ND	109	69-132
Dibromomethane	540.4	10.0	ug/L	500	ND	108	70-147
Bromodichloromethane	533.7	10.0	ug/L	500	ND	107	67-130
cis-1,3-Dichloropropene	502.1	10.0	ug/L	503	ND	99.8	61-126
4-Methyl-2-pentanone (MIBK)	1052	50.0	ug/L	1010	ND	104	55-147
Toluene	516.0	10.0	ug/L	500	ND	103	71-133
trans-1,3-Dichloropropene	465.5	10.0	ug/L	504	ND	92.3	63-124
1,1,2-Trichloroethane	497.0	10.0	ug/L	500	ND	99.4	69-133
Tetrachloroethylene	507.3	10.0	ug/L	500	ND	101	70-124
2-Hexanone (MBK)	996.9	50.0	ug/L	1030	ND	96.5	53-141
Dibromochloromethane	458.2	10.0	ug/L	495	ND	92.6	74-122
1,2-Dibromoethane	469.2	10.0	ug/L	500	ND	93.8	66-127
Chlorobenzene	494.6	10.0	ug/L	500	ND	98.9	76-116
1,1,1,2-Tetrachloroethane	473.3	10.0	ug/L	500	ND	94.7	77-121
Ethylbenzene	516.4	10.0	ug/L	500	ND	103	73-124

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1243 - EPA 5030B - EPA 8260B										
Matrix Spike (1GJ1243-MS1)	Source: 1GJ1446-01			Prepared: 10/19/23 00:00 Analyzed: 10/19/23 21:45						
Xylenes, total	1486	20.0	ug/L	1500	ND	99.1	75-123			
Styrene	510.2	10.0	ug/L	500	ND	102	70-120			
Bromoform	493.0	10.0	ug/L	500	ND	98.6	70-124			
1,2,3-Trichloropropane	508.1	10.0	ug/L	500	ND	102	62-135			
trans-1,4-Dichloro-2-butene	989.8	50.0	ug/L	1040	ND	95.3	50-120			
1,1,2,2-Tetrachloroethane	521.9	10.0	ug/L	498	ND	105	63-126			
1,4-Dichlorobenzene	480.8	10.0	ug/L	500	ND	96.2	72-119			
1,2-Dichlorobenzene	489.1	10.0	ug/L	500	ND	97.8	71-117			
1,2-Dibromo-3-chloropropane	537.8	50.0	ug/L	500	ND	108	49-134			
Surrogate: Dibromofluoromethane	447		ug/L	504		88.8	75-136			
Surrogate: 1,2-Dichloroethane-d4	466		ug/L	504		92.5	61-142			
Surrogate: Toluene-d8	494		ug/L	502		98.2	82-121			
Surrogate: 4-Bromofluorobenzene	482		ug/L	504		95.7	80-116			
Matrix Spike Dup (1GJ1243-MSD1)	Source: 1GJ1446-01			Prepared: 10/19/23 00:00 Analyzed: 10/19/23 22:12						
Chloromethane	287.9	10.0	ug/L	300	ND	96.0	61-152	4.32	26	
Vinyl Chloride	289.4	10.0	ug/L	300	ND	96.5	66-149	4.59	23	
Bromomethane	298.1	10.0	ug/L	300	ND	99.4	43-171	4.77	29	
Chloroethane	269.8	10.0	ug/L	300	ND	89.9	69-148	2.63	25	
Trichlorofluoromethane	289.6	10.0	ug/L	300	ND	96.5	62-163	1.34	25	
1,1-Dichloroethylene	497.0	10.0	ug/L	500	ND	99.4	70-148	4.25	22	
Acetone	1117	100	ug/L	1020	ND	110	45-173	0.719	30	
Methyl Iodide	991.8	10.0	ug/L	997	ND	99.5	62-167	7.01	24	
Carbon Disulfide	963.6	10.0	ug/L	1010	ND	95.4	71-163	4.47	22	
Methylene Chloride	452.2	50.0	ug/L	500	ND	90.4	69-140	3.52	19	
trans-1,2-Dichloroethylene	492.9	10.0	ug/L	500	ND	98.6	69-144	3.14	22	
1,1-Dichloroethane	492.1	10.0	ug/L	500	ND	98.4	70-138	1.93	20	
Vinyl Acetate	864.7	50.0	ug/L	1020	ND	84.9	58-142	1.30	24	
cis-1,2-Dichloroethylene	529.8	10.0	ug/L	495	ND	107	68-151	0.621	22	
2-Butanone (MEK)	1086	100	ug/L	1030	ND	105	50-160	7.43	23	
Bromochloromethane	486.0	10.0	ug/L	500	ND	97.2	65-143	0.718	22	
Chloroform	488.2	10.0	ug/L	500	ND	97.6	71-143	0.978	21	
1,1,1-Trichloroethane	505.1	10.0	ug/L	500	ND	101	63-133	0.0792	23	
Carbon Tetrachloride	519.5	10.0	ug/L	500	ND	104	63-142	0.250	22	
Benzene	535.1	10.0	ug/L	500	ND	107	69-133	2.67	18	
1,2-Dichloroethane	495.8	10.0	ug/L	500	ND	99.2	63-138	1.26	20	
Trichloroethylene	531.0	10.0	ug/L	500	ND	106	71-133	1.48	23	
1,2-Dichloropropane	540.5	10.0	ug/L	500	ND	108	69-132	1.14	20	
Dibromomethane	535.3	10.0	ug/L	500	ND	107	70-147	0.948	22	
Bromodichloromethane	533.7	10.0	ug/L	500	ND	107	67-130	0.00	21	
cis-1,3-Dichloropropene	507.4	10.0	ug/L	503	ND	101	61-126	1.05	21	
4-Methyl-2-pentanone (MIBK)	1070	50.0	ug/L	1010	ND	106	55-147	1.72	23	
Toluene	509.2	10.0	ug/L	500	ND	102	71-133	1.33	19	

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1243 - EPA 5030B - EPA 8260B										
Matrix Spike Dup (1GJ1243-MSD1)	Source: 1GJ1446-01			Prepared: 10/19/23 00:00 Analyzed: 10/19/23 22:12						
trans-1,3-Dichloropropene	471.4	10.0	ug/L	504	ND	93.5	63-124	1.26	21	
1,1,2-Trichloroethane	501.8	10.0	ug/L	500	ND	100	69-133	0.961	19	
Tetrachloroethylene	494.4	10.0	ug/L	500	ND	98.9	70-124	2.58	24	
2-Hexanone (MBK)	1023	50.0	ug/L	1030	ND	99.0	53-141	2.56	24	
Dibromochloromethane	461.9	10.0	ug/L	495	ND	93.3	74-122	0.804	21	
1,2-Dibromoethane	467.5	10.0	ug/L	500	ND	93.5	66-127	0.363	23	
Chlorobenzene	488.6	10.0	ug/L	500	ND	97.7	76-116	1.22	21	
1,1,1,2-Tetrachloroethane	465.8	10.0	ug/L	500	ND	93.2	77-121	1.60	25	
Ethylbenzene	506.5	10.0	ug/L	500	ND	101	73-124	1.94	20	
Xylenes, total	1469	20.0	ug/L	1500	ND	97.9	75-123	1.16	20	
Styrene	509.1	10.0	ug/L	500	ND	102	70-120	0.216	23	
Bromoform	508.5	10.0	ug/L	500	ND	102	70-124	3.10	22	
1,2,3-Trichloropropane	515.0	10.0	ug/L	500	ND	103	62-135	1.35	28	
trans-1,4-Dichloro-2-butene	1038	50.0	ug/L	1040	ND	99.9	50-120	4.73	26	
1,1,2,2-Tetrachloroethane	524.8	10.0	ug/L	498	ND	105	63-126	0.554	24	
1,4-Dichlorobenzene	480.9	10.0	ug/L	500	ND	96.2	72-119	0.0208	24	
1,2-Dichlorobenzene	491.9	10.0	ug/L	500	ND	98.4	71-117	0.571	24	
1,2-Dibromo-3-chloropropane	556.5	50.0	ug/L	500	ND	111	49-134	3.42	28	
Surrogate: Dibromofluoromethane	451		ug/L	504		89.5	75-136			
Surrogate: 1,2-Dichloroethane-d4	476		ug/L	504		94.5	61-142			
Surrogate: Toluene-d8	493		ug/L	502		98.1	82-121			
Surrogate: 4-Bromofluorobenzene	486		ug/L	504		96.3	80-116			
Batch 1GJ1371 - EPA 5030B - EPA 8260B										
Blank (1GJ1371-BLK1)	Prepared: 10/20/23 00:00 Analyzed: 10/20/23 09:38									
Acrylonitrile	<5.0	5.0	ug/L							
Surrogate: Dibromofluoromethane	45.8		ug/L	50.4		90.9	80-126			
Surrogate: 1,2-Dichloroethane-d4	51.2		ug/L	50.4		101	63-138			
Surrogate: Toluene-d8	50.9		ug/L	50.2		101	87-116			
Surrogate: 4-Bromofluorobenzene	52.0		ug/L	50.4		103	85-111			
LCS (1GJ1371-BS1)	Prepared: 10/20/23 00:00 Analyzed: 10/20/23 08:30									
Surrogate: Dibromofluoromethane	46.8		ug/L	50.4		92.9	80-126			
Surrogate: 1,2-Dichloroethane-d4	50.0		ug/L	50.4		99.1	63-138			
Surrogate: Toluene-d8	51.5		ug/L	50.2		102	87-116			
Surrogate: 4-Bromofluorobenzene	51.5		ug/L	50.4		102	85-111			
LCS Dup (1GJ1371-BSD1)	Prepared: 10/20/23 00:00 Analyzed: 10/20/23 08:52									
Surrogate: Dibromofluoromethane	46.5		ug/L	50.4		92.3	80-126			
Surrogate: 1,2-Dichloroethane-d4	50.2		ug/L	50.4		99.6	63-138			
Surrogate: Toluene-d8	51.8		ug/L	50.2		103	87-116			
Surrogate: 4-Bromofluorobenzene	51.5		ug/L	50.4		102	85-111			

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1470

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1371 - EPA 5030B - EPA 8260B										
Matrix Spike (1GJ1371-MS1)	Source: 1GJ1590-01			Prepared: 10/20/23 00:00 Analyzed: 10/20/23 19:49						
Acrylonitrile	226.1	20.0	ug/L	200	ND	113	58-151			
Surrogate: Dibromofluoromethane	191		ug/L	201		94.9	80-126			
Surrogate: 1,2-Dichloroethane-d4	215		ug/L	202		107	63-138			
Surrogate: Toluene-d8	210		ug/L	201		105	87-116			
Surrogate: 4-Bromofluorobenzene	208		ug/L	202		103	85-111			
Matrix Spike Dup (1GJ1371-MSD1)	Source: 1GJ1590-01			Prepared: 10/20/23 00:00 Analyzed: 10/20/23 19:26						
Acrylonitrile	107.3	20.0	ug/L	200	ND	53.6	58-151	71.2	15	QM-21
Surrogate: Dibromofluoromethane	193		ug/L	201		95.9	80-126			
Surrogate: 1,2-Dichloroethane-d4	218		ug/L	202		108	63-138			
Surrogate: Toluene-d8	208		ug/L	201		103	87-116			
Surrogate: 4-Bromofluorobenzene	209		ug/L	202		104	85-111			

Definitions

QM-21:	The recovery for the blank spike was outside the established laboratory control limits. The batch was accepted based upon the acceptable recovery of the CCV.
RL:	Reporting Limit
RPD:	Relative Percent Difference

Cooler Receipt Log

Cooler ID: Default Cooler Temp: 0.0°C

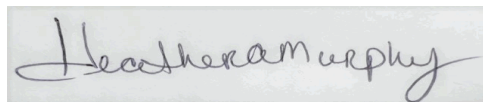
Cooler Inspection Checklist

Custody Seals	No	Containers Intact	Yes
COC/Labels Agree	No	Preservation Confirmed	No
Received On Ice	Yes		

Report Comments

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.

Reviewed and Approved By:



Heather Murphy
Customer Relationship Specialist
heather.murphy@microbac.com
11/02/23 11:45



HLW Engineering
PM: Sue Thompson

www.keystonelabs.com

SITE INFORMATION

Sampler: TODD WHIPPLE
Project: Marshall Sanitary Landfill-New Regs
6003

SPECIAL INSTRUCTIONS

None

Turn Around Time

☐ Standard ☐ RUSH, need by ___/___/___

REPORT TO

Todd Whipple
HLW Engineering
PO Box 314
Story City, IA 50248

Don Ballalatak
Marshall County Landfill
2313 Marshalltown Blvd
Marshalltown, IA 50158

LAB USE ONLY

Work Order 16J1470
Temperature 0.0
Turn-Cooler: No

☐ Custody Seal
☒ Containers Intact
☐ COC/Labels Agree
☐ Preservation Confirmed
☒ Received on Ice

Number	Sample Identification / Client ID	Matrix	Sample Type	Date	Time	Number of Containers	Analyses	Lab Sample Number
01-001	MW-213	Water	GRAB	<u>10/13/23</u>	<u>10:50</u>	<u>6</u>	landfill-app1-voc-group landfill-app1-metals-6003	<u>01</u>

Relinquished By Todd Whipple Date/Time 10-17-23

Received By [Signature] Date/Time 10-17-23 7:00

Relinquished By [Signature] Date/Time 10-17-23 7:00

Remarks:

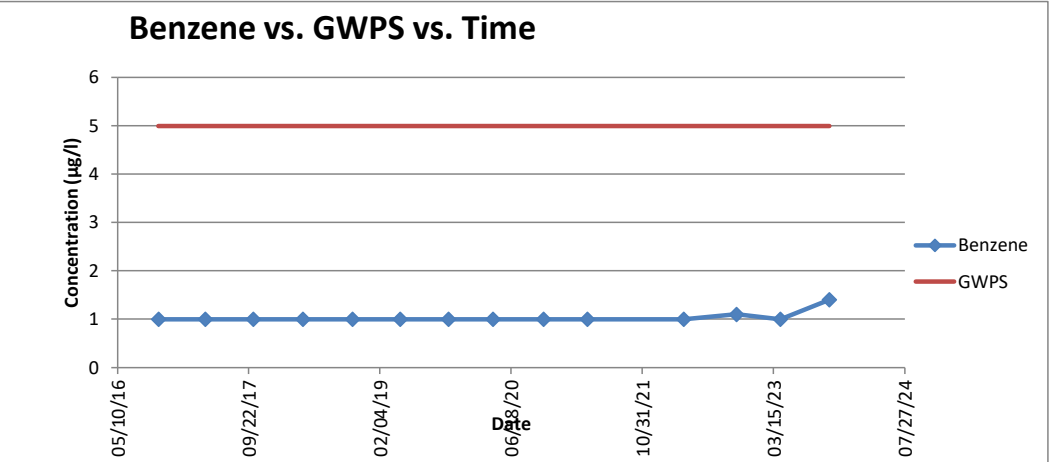
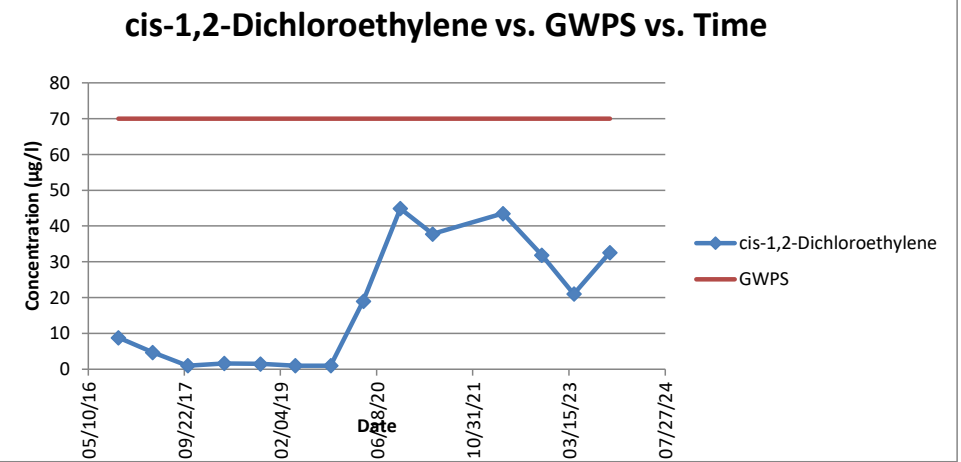
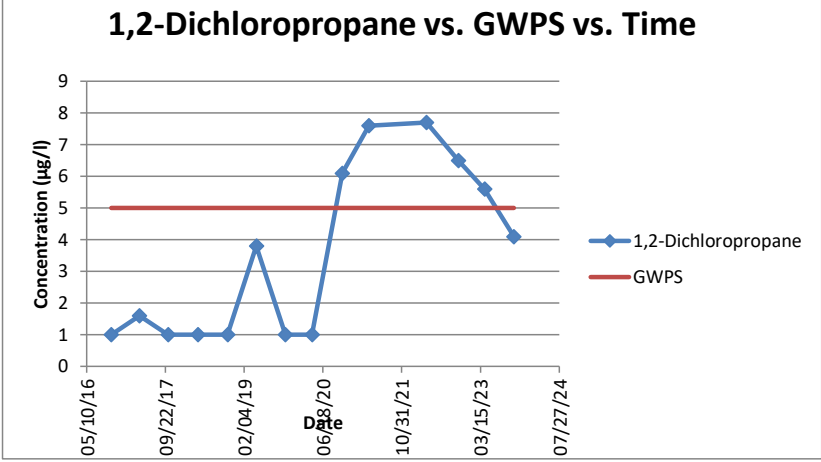
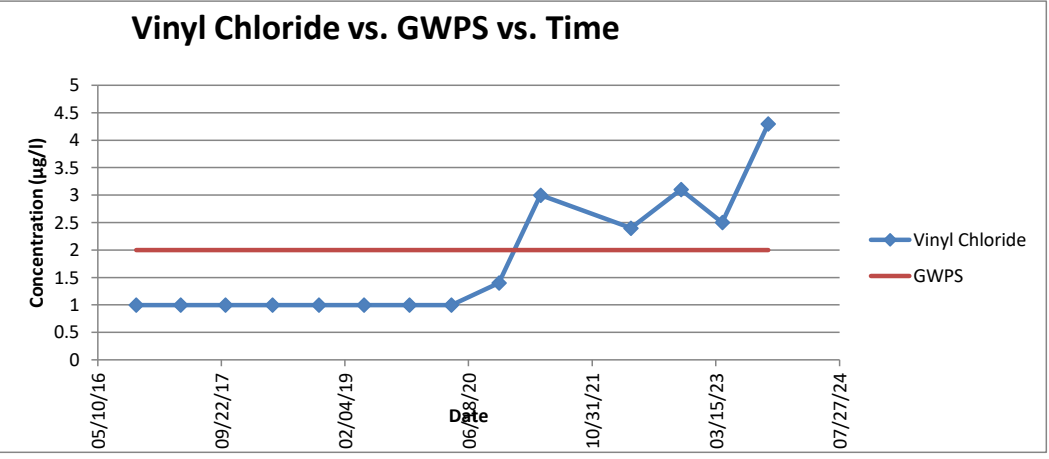
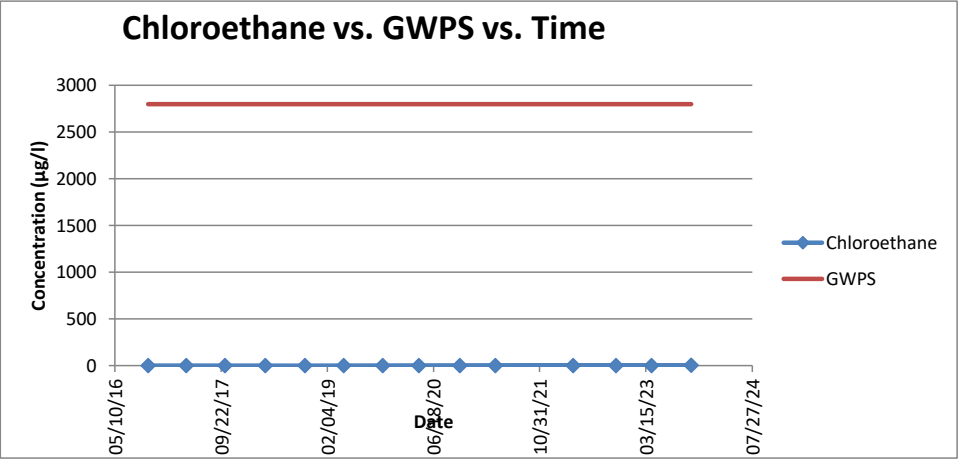
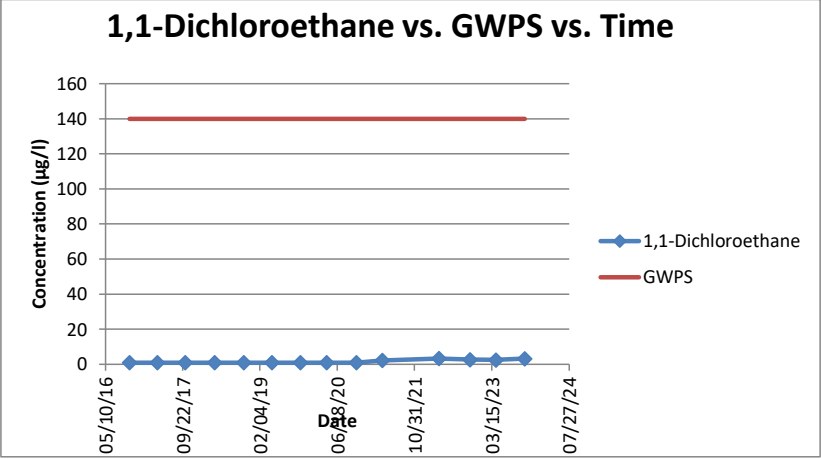
Original - Lab Copy Yellow - Sampler Copy

ATTACHMENT B

Water Quality Summary Tables and Graphs

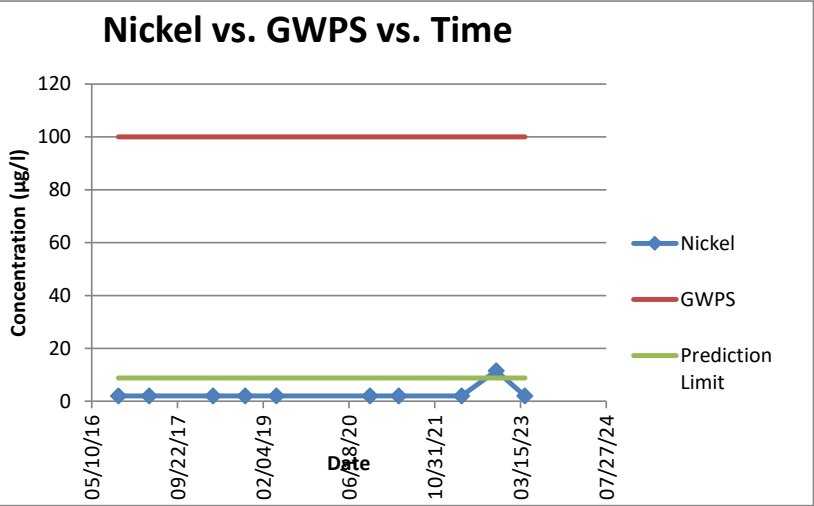
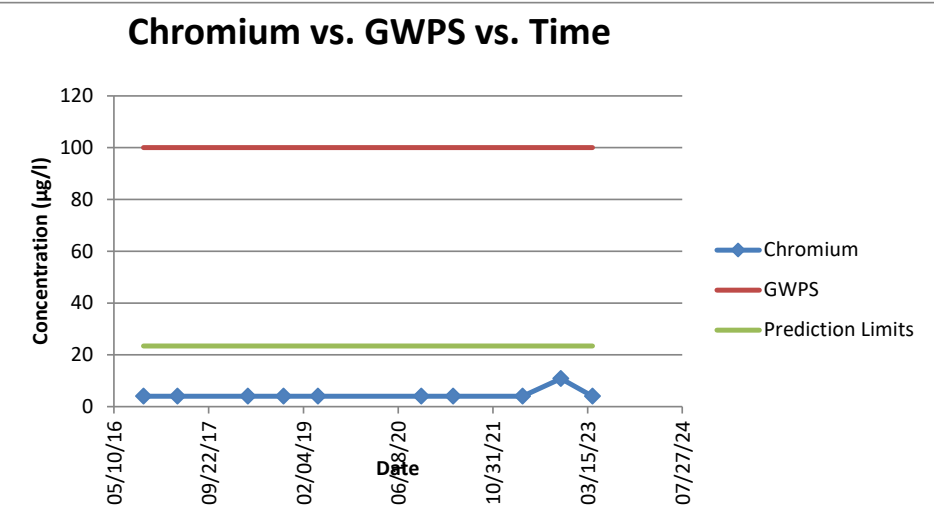
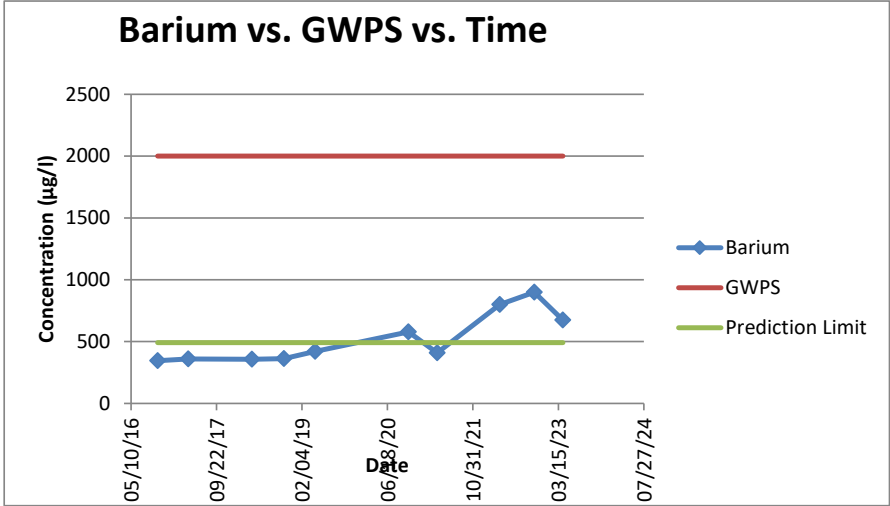
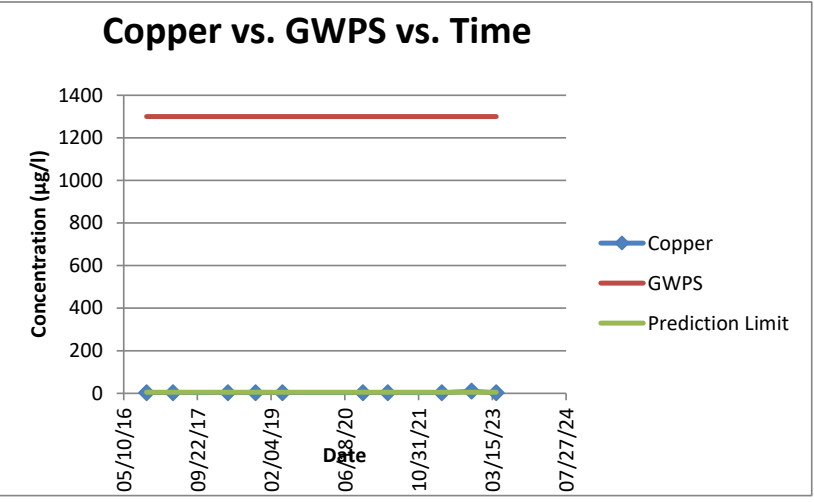
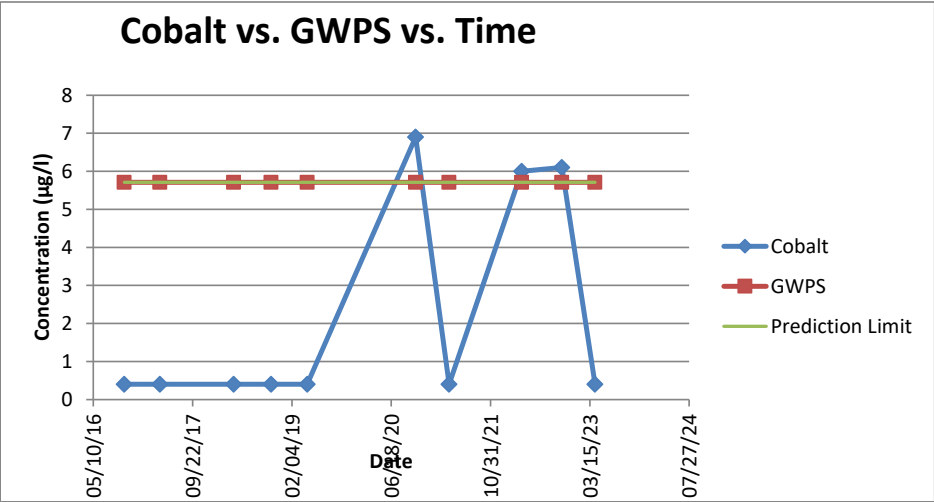
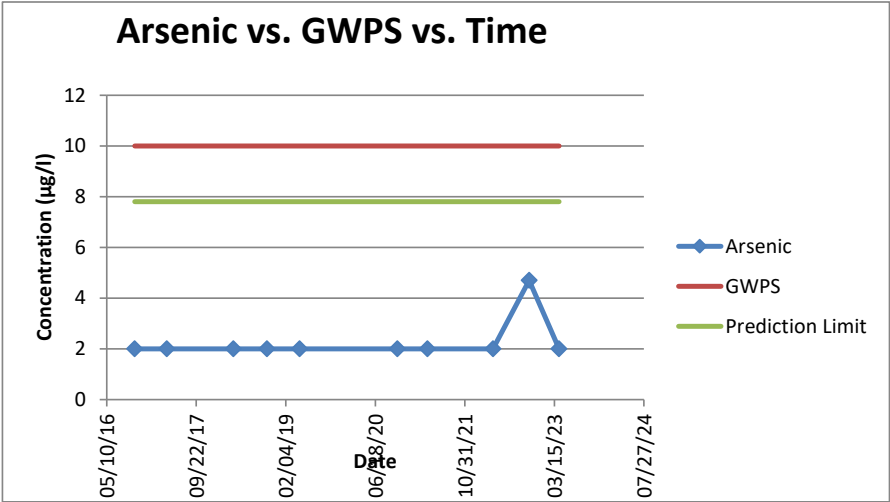
MW-213 - AREA A
Annual Water Quality Report
Marshall County Sanitary Landfill
Permit No. 64-SDP-06-92C

Sample Date	1,1-Dichloroethane		1,2-Dichloropropane		Chloroethane		cis-1,2-dichloroethene		Vinyl Chloride		Benzene	
	Concentration	GWPS	Concentration	GWPS	Concentration	GWPS	Concentration	GWPS	Concentration	GWPS	Concentration	GWPS
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
10/13/2016	1	140	1	5	1	2800	8.8	70	1	2	1	5
4/10/2017	1	140	1.6	5	1	2800	4.7	70	1	2	1	5
10/9/2017	1	140	1	5	1	2800	1	70	1	2	1	5
4/17/2018	1	140	1	5	1	2800	1.6	70	1	2	1	5
10/22/2018	1	140	1	5	1	2800	1.5	70	1	2	1	5
4/22/2019	1	140	3.8	5	1	2800	1	70	1	2	1	5
10/23/2019	1	140	1	5	1	2800	1	70	1	2	1	5
4/10/2020	1	140	1	5	1	2800	19	70	1	2	1	5
10/19/2020	1	140	6.1	5	1.5	2800	44.9	70	1.4	2	1	5
4/5/2021	2.2	140	7.6	5	2.6	2800	37.8	70	3.0	2	1	5
4/6/2022	3.3	140	7.7	5	2.6	2800	43.5	70	2.4	2	1	5
10/25/2022	2.7	140	6.5	5	3.0	2800	31.9	70	3.1	2	1.1	5
4/10/2023	2.5	140	5.6	5	2.5	2800	21	70	2.5	2	1	5
10/13/2023	3.2	140	4.1	5	4.2	2800	32.6	70	4.3	2	1.4	5



MW-213 - AREA A
Annual Water Quality Report
Marshall County Sanitary Landfill
Permit No. 64-SDP-06-92C

Sample Date	Arsenic			Barium			Cobalt			Chromium			Copper			Nickel		
	Concentration	PL	GWPS	Concentration	PL	GWPS	Concentration	PL	GWPS	Concentration	PL	GWPS	Concentration	PL	GWPS	Concentration	PL	GWPS
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
10/13/2016	2	7.8	10	345	491.54	2000	0.4	5.71	5.71	4	23.4	100	2	5.3	1300	2	8.8	100
4/10/2017	2	7.8	10	360	491.54	2000	0.4	5.71	5.71	4	23.4	100	2	5.3	1300	2	8.8	100
4/17/2018	2	7.8	10	357	491.54	2000	0.4	5.71	5.71	4	23.4	100	2	5.3	1300	2	8.8	100
10/22/2018	2	7.8	10	362	491.54	2000	0.4	5.71	5.71	4	23.4	100	2	5.3	1300	2	8.8	100
4/22/2019	2	7.8	10	421	491.54	2000	0.4	5.71	5.71	4	23.4	100	2	5.3	1300	2	8.8	100
10/19/2020	2	7.8	10	578	491.54	2000	6.9	5.71	5.71	4	23.4	100	2	5.3	1300	2	8.8	100
4/5/2021	2	7.8	10	409	491.54	2000	0.4	5.71	5.71	4	23.4	100	2	5	1300	2	9	100
4/6/2022	2	7.8	10	800	491.54	2000	6.0	5.71	5.71	4	23.4	100	2	5.3	1300	2	8.8	100
10/25/2022	4.7	7.8	10	899	491.54	2000	6.1	5.71	5.71	10.8	23.4	100	9.6	5.3	1300	11.5	8.8	100
4/10/2023	2	7.8	10	674	491.54	2000	0.4	5.71	5.71	4	23.4	100	2	5.3	1300	2	8.8	100



ATTACHMENT C

Water Elevation and Turbidity Data

MW-213 - AREA A
Annual Water Quality Report
Marshall County Sanitary Landfill
Permit No. 64-SDP-06-92C

Sample Date	Top of Casing (Elevation)	Depth to Water (feet)	Water Surface (Elevation)	Top of Screen (Elevation)	Bottom of Screen (Elevation)	Turbidity (NTU)
10/13/2016	950.9	27.09	923.81	930.9	915.9	0.16
4/10/2017	950.9	23.42	927.48	930.9	915.9	0.31
4/17/2018	950.9	30.7	920.2	930.9	915.9	2.87
10/22/2018	950.9	23.46	927.44	930.9	915.9	0.55
4/22/2019	950.9	25.34	925.56	930.9	915.9	0.55
10/19/2020	950.9	33.43	917.47	930.9	915.9	4.87
4/5/2021	950.9	31.69	919.21	930.9	915.9	3.38
4/6/2022	950.9	33.97	916.93	930.9	915.9	1.57
10/25/2022	950.9	33.91	916.99	930.9	915.9	72.2
4/10/2023	950.9	31.96	918.94	930.9	915.9	1.06
10/13/2023	950.9	34.14	916.76	930.9	915.9	17.66

